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Railway Age

FIRST HALF OF 1924—No. 15 NEW YORK—MARCH 15, 1924—CHICAGO SIXTY-NINTH YEAR

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Alphabetical Index to Advertisements, Page 86

Classified Directory of Advertisers, Page 82

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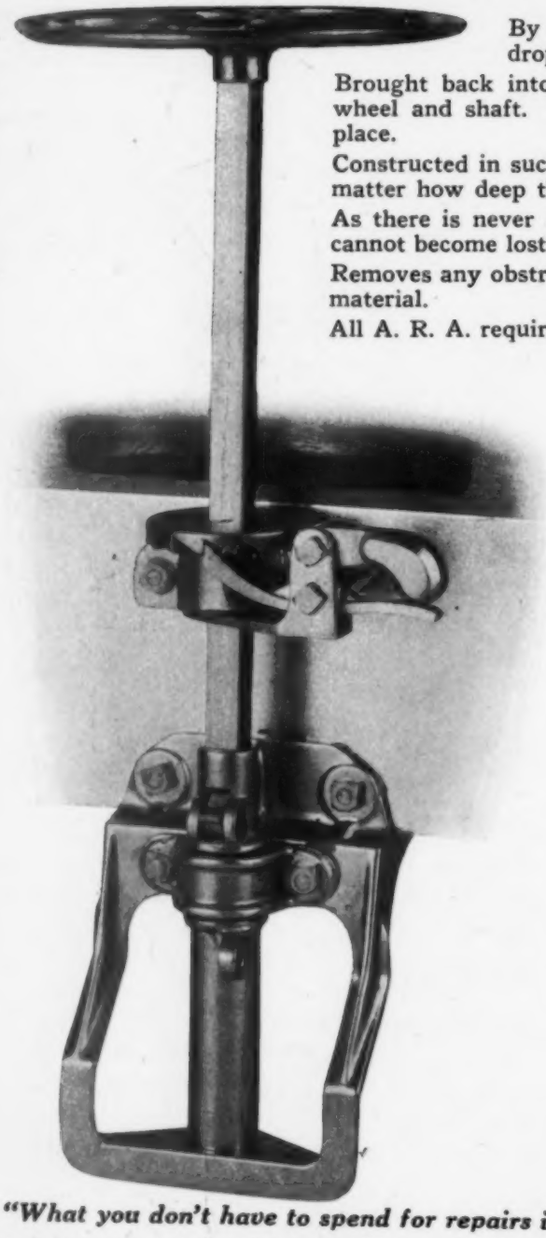

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Volume 76 Number 15

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EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Locomotive Development and Terminal Facilities

A certain railroad purchased some Mallet locomotives, intended and correctly designed, for through freight service on divisions over 100 miles in length. Unfortunately, however, the railroad did not have a turntable long enough for this motive power. Wyes were used for turning the locomotives but this did not enable them to be placed in enginehouses and no other shelter was provided for their accommodation at terminals. These locomotives were later sold to another railroad. That they proved unsatisfactory in the service for which they were intended may be attributed to inadequate terminal facilities rather than to faulty design or difficult operating conditions between terminals. At the time these locomotives were purchased it is probable that an expenditure for locomotive terminal improvements amounting to less than one-half that paid for the new motive power would have enabled the locomotives to perform satisfactorily. While only one-half of the sum expended for the new locomotives was required for terminal improvements, the difficulty of obtaining the funds for this purpose would have been twice as great, if not actually insurmountable. Other instances might be cited that illustrate the tendency to purchase motive power beyond the handling capacity of existing locomotive terminals because no means for financing terminal improvements on a basis comparable to the equipment trust has been available to the railroads. Are the railroads justified in purchasing modern, heavy motive power when they have not the terminal and other facilities needed for its most efficient use? This question was answered partially at least at a recent meeting of the New England Railroad Club when the development of the modern locomotive was under discussion. The speaker of the evening referred to the limitations placed upon locomotive builders by clearance dimensions, strength of bridges, rail weights and terminal facilities. It was pointed out that the builders would still be constructing very primitive locomotive types if they had actually accepted the limitations of existing locomotive terminals. The railroads have not accepted these limitations but they are paying dearly for the absence of the terminal facilities.

Track Joints and Track Maintenance

The joint has long been recognized as the weak link in the track structure. It is here that deterioration first occurs and it is because of the weakness at this point that a large part of the expenditure for labor and materials is necessary. This condition is not new for it has always prevailed, but little has been done about it. For this reason it would appear that it is regarded as a necessary handicap which must be endured. Yet it is worth while to consider whether this is so. If it is correct, evidence should be available to demonstrate, (1) that the number of joints now in track cannot be reduced, and (2) that the designs now used are the best that can be secured. As to the first point, there has been a gradual increase in the length of rails over a long period of time until the 33 ft. rail is now used almost universally. There has been a tendency in some quarters to urge the adoption of a longer rail and the Rail committee of the American Railway Engineering Association has had this subject under consideration for some time, but has not yet recommended any change from the existing length. In the past the length of rails has been fixed by the lengths of the cars readily available for their transportation. The steel mills have also endeavored to retard the use of longer rails by imposing an extra charge for their rolling. However, it may be questioned if these conditions should be allowed to overshadow the important savings in the cost of track maintenance which will result from decreasing the number of joints (and the corresponding number of weak points) in the track. The design of rail joints has long been a favorite goal for the inventor and patent office contains records of many designs, relatively few of which, however, have been developed commercially. Unfortunately, in the selection of a joint first cost is commonly given undue importance as compared with the cost of maintenance, to the handicap not only of the producer of the stronger and more efficient joint but also of the track force whose duty it is to maintain these joints. As pointed out in another column the selection of a track joint should be made on the basis of economy, including all factors and particularly that of the cost of maintenance.

The Virtue of Comparability

The *Railway Age* is favored this week in being able to publish in its columns two important communications, the one from one of the country's leading accounting officers and the other from one of the country's leading authorities on the work of the purchasing and stores department. The accounting officer is A. J. County, vice-president in charge of accounting of the Pennsylvania system and president of the Railway Accounting Officers Association. The authority on purchasing and stores is George G. Yeomans, recognized for many years as one of the leaders in his subject. Both letters relate to the tentative revision of the operating expenses classification, which is now under discussion by the Bureau of Accounts of the Interstate Commerce Commission and the general accounts committee of the Railway Accounting Officers Association. The accounting officers have had difficulty in agreeing in their views concerning the tentative revision. The views of "Assistant Comptroller" presented in the *Railway Age* of February 2 and 16 are, in general effect, those of one group of the general accounts committee—the majority group as it happens—whereas those of Mr. County reflect the opinions of the other group. The views of an accounting officer of Mr. County's standing necessarily have great weight. One will be impressed particularly by the importance he gives to the accounting needs of a budget system. He has considerable to say concerning comparability. The *Railway Age* has already expressed its views on this factor, which views we regret to say are not at one with those of Mr. County. It is not the *Railway Age's* intention to create the impression that comparability is the most important object to be obtained in any new classification. Nevertheless, it believes that the loss of comparability must be offset by outstanding advantages either in the form of marked accounting savings to the carriers or marked advancement in the utility of the new classification for purposes of control. The

question is whether the new classification meets either of these requirements to a sufficient degree to offset the loss of the feature of comparability or whether such advantages as are claimed for it may not be secured without such a loss.

Purchasing and Stores Expenses

Mr. Yeomans, in his communication entitled "An Aid to Economical Operation," presents an able analysis of the desirability of including in the operating expenses classification a primary account showing separately expenses for purchases and stores. There can perforce be no disagreement with his general thesis. Purchasing and stores costs are at present distributed in the accounts to the material and so are lost in the primary account to which the material itself is charged. As a result no one has any adequate idea of how much the purchasing and stores activity may be costing. With separately shown purchases and stores figures before him as would be provided with Mr. Yeomans' suggestion, the busy executive could be given realization, such as few executives now have, of the importance of the purchasing and stores department. Such an executive, on realization of the cost of the work, would be led to give it more attention than it now receives and the degree of attention that it properly deserves. If there is any question of Mr. Yeomans' views it will unquestionably relate to the idea of setting forth a new single primary account under general account V—Other Departments and Expenses, as the Bureau of Accounts tentative revision provides. The accounting officers seem to be agreed on the desirability in any revision of the operating expenses classification of reducing the number of primary accounts. Such disagreement as has occurred seems to revolve around the idea of changing the make-up of the general accounts. The latest suggestion by the Accounting Officers Association calls for modifications by consolidation of primary accounts, leaving the general accounts unchanged. It is significant that there are embodied in the latest suggestions new primary accounts entitled "Purchasing and Store Expenses" under each of the general accounts for Maintenance of Way, Maintenance of Equipment and Transportation, each of the three primary accounts to include its department's proportion of purchasing and stores expenses. This, as we see it, follows out Mr. Yeomans' general idea, so it is apparent that the accounting officers and Mr. Yeomans find themselves not far from agreement in this important matter.

Reduction in Rate Level in 1923

That freight rates are coming down appreciably, if slowly, and without drastic general reductions or legislation, is shown by the traffic statistics just issued by the Interstate Commerce Commission for 1923. There were no very general reductions in rates during that year and yet the nation's freight bill was some $248,000,000 less than it would have been if the average rate paid to the roads for transporting a ton one mile had been the same as the average for 1922, and over $607,000,000 less than would have been paid in freight charges at the average rate of 1921. The commission's statistics show the average revenue per ton-mile received by the Class I railroads for 1923 to have been 1.116 cents, as compared with 1.176 cents in 1922 and 1.253 cents in 1921. The latter year was the one in which the average was the highest it has been in recent years because the general advance made by the Interstate Commerce Commission in 1920 was in effect only during the last four months of that year. As compared with 1921, therefore, the average rate paid last year represents a reduction of 11.6 per cent, and as compared with 1922, during which year some rather general reductions were made both by order of the Interstate Commerce Commission and voluntarily by the railroads, the average for 1923 represents a reduction of about 5 per cent. These are small figures, but when a ton of freight can be hauled a distance of one mile for hardly more than half the cost of a postage stamp the differences in this small unit are not pronounced. When multiplied by the 413,562,132,000 ton-miles of freight handled by the railroads last year, however, the slight reduction per ton-mile makes an appreciable showing, probably a greater one than would result in the long run from some of the impracticable legislative schemes that have been advanced. Incidentally the unfairness of attributing the fact that transportation still costs more than it used to, to any so-called "guaranty" of the transportation act is strikingly shown when it is recalled that the railroads fell considerably short, even in this year of record-breaking traffic, of earning what the commission has held to be a fair return on the value of their property, and that they would not have fallen short if their average receipts per ton-mile had been even the same as in 1922.

One Experiment at a Time

The tests which have recently been completed by the Lehigh Valley on its three-cylinder Mountain type freight locomotive, a summary of which appears elsewhere in this issue, suggest a promising future for this type of locomotive. The outstanding advantages which have been claimed for the three-cylinder locomotive, are its more uniform torque, the lower factor of adhesion which this makes practicable and the improvement in combustion conditions resulting from the more frequent and softer exhaust impulses. The Lehigh Valley tests indicate that these advantages are actually realized in practice and, furthermore, that when once in motion, the three-cylinder locomotive can handle its train at a cut-off shorter than is required with the two-cylinder type. Lehigh Valley locomotive No. 5,000 was built primarily to determine the characteristics of the three-cylinder feature and it is worthy of note that in other respects the locomotive is built along straightforward lines with as little to differentiate it from other types regularly in service as possible. The outstanding omissions of equipment which might be expected on a locomotive of advanced design are the feedwater heater and the booster. A most important consideration in any experiment, however, is the elimination of as many variables as possible, with the exception of one the effect of which it is the purpose to measure. Some years ago a single locomotive in a class of new power was selected for test purposes and equipped with every special material and trial device the investigation of which seemed desirable at the time. No doubt some of the material and the special equipment on this locomotive had real merit. Others, however, failed to demonstrate the advantages claimed for them and the actual failures were sufficient to make the locomotive as a whole exceedingly unpopular. The reputation of the good features suffered with the bad. Where experiments of this kind are tried there is always grave danger that the effect of one variable may be masked by that of others to such an extent that no conclusions of any value with respect to any of the special features can be stated after the investigation is complete. This fact, while so simple that it needs no argument in its defense, has too frequently been overlooked, possibly in an attempt to conduct as many trials as possible with a minimum outlay, or in order to simplify observations in service so that a number of conclusions may be quickly reached. The results, however, usually leave the status of all of the features in doubt, or even worse, condemn them all because of the failure of some one in the group.

Interlocking Done Away With —Not Needed

Helena, St. Lawrence County, New York, four miles from the Canadian border, on a minor line of the New York Central System, population 160, is one of the smallest dots in the atlas, and most of us never before heard of it. But today it is on the map in large letters; the location of the very latest kink in signaling, as will be seen by an article printed on another page describing crossing signals being installed there; automatic block signals taking the place of mechanical interlocking. Automatic signals, home and distant, are located at the four approaches to a grade crossing of two single-track railroads, and are so controlled by track circuit relays, combined and recombined, that complete control of train movements is provided and no signalman or interlocking machine is required. It is a completely signaled crossing with no expense for wages other than a part of the pay of the maintainer. These are not the first automatic crossing signals ever set up; but, as compared with the very few plants heretofore installed, this one provides more complete conveniences and safeguards. The main elements of the present arrangement have been tested at Utica, N. Y., for more than twelve months, so that there is no doubt about its success. There should be a rather large field for signaling of this kind. The arrangement is not likely to find favor for the very busy crossings, or at places where derails must be used; and, of course, there would be no saving of wages at places where an attendant is required for setting switches or for other important duties; but outside of this class there are numerous crossings, not now satisfactorily signaled, which ought to benefit by this arrangement. A crossing of main tracks, with no signals at all, is like an ink-blot on a clean drawing —a thing which everyone desires to get rid of. If important trains have to use such a crossing and are subjected to the stop-rule, the passenger traffic manager feels—or should feel—like apologizing to each passenger. A crossing where traffic is very light still is an annoyance, even if properly signaled, because of the disproportionate cost of its operation. Other makeshifts at crossings have varied drawbacks. Mr. Elliott's scheme affords a means by which at many places all these undesirable conditions can readily be done away with, at very decided savings. Operating officers who lack the time or the patience to follow the details of the electric circuits in our description should nevertheless read the rest of the article, for it merits the attention of every reader who is interested in the economical operation of crossings.

Building for the Future

The article on "How to Start Personnel Work on a Railroad" by J. C. Clark, on another page of this issue, was prepared at our request. This question is being frequently asked by railroad officers in these days. Different people may answer it in different ways—indeed several railroads have approached the question from widely varying viewpoints and are trying to solve it in various ways. Mr. Clark is not a theorist. He has studied the personnel question on the railroads thoroughly, but from a practical standpoint. He came up through the train service and has had an opportunity of trying out in a limited way many things which he mentions in his article. He has also made it his business to find out just how far industries have gone into this problem and as to the results which they have obtained. He is not now in railroad service but still keeps closely in touch with the progress of the railroads in dealing with this personnel question. His previous articles in the *Railway Age* were so well received and of such a practical nature that we asked him for a definite expression as to his views on exactly how to go about building up a personnel department.

A Criticism and an Offer of Co-operation

The suggestion offered by L. E. Keller of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, which appears in this issue as a letter to the editor, deserves the serious consideration of railway managements. The employment situation in the maintenance of way department, particularly as affecting the track forces, is admittedly unsatisfactory. The men now recruited for this work are largely of a type that does not make for effective results. But, even more serious is the fact that it presents an unusually unfavorable field from which to select capable section foremen. While the rate of pay is an important factor to be considered, it is not so vital as the uncertainty of employment. No man who possesses any interest whatever in his work beyond the compensation it affords him will be satisfied with a job that may terminate on a day's notice and which he may be reasonably sure will end at the close of a summer working season. As a consequence, it is certain that authority for an increase in forces brings back to the railroads only those men, of the number who are laid off, that could not obtain better employment in other lines. It is to be inferred, also, that Mr. Keller's letter was prompted by the fact that this condition has imposed a similar predicament on the brotherhood and that his plea for greater permanence of force will, if made effective, accrue to the advantage of the brotherhood as well as the railroads. It is to be conceded, as stated in Mr. Keller's letter, that the problem of all-year employment of track forces imposes certain formidable difficulties, but, as he points out, it would seem that the roads are inclined to take this condition as an excuse for a drastic cut in the forces upon the coming of cold weather, rather than to make the adjustment on the basis of the actual needs. Whether there is any merit to his accusation cannot be determined off-hand, but surely the present situation in the employment of the track forces is not what it should be and it is not to be expected that the condition can be improved or that better men may be obtained who can be promoted to foremen until careful studies have been made to ascertain what changes in present practices are necessary to insure a more efficient use of the moneys expended for labor and track maintenance.

The Burden of Unnecessary Reports

GENERAL ACCEPTANCE has been accorded for many years and in nearly all quarters to the belief that one of the most burdensome evils of railway regulation has been the excessive volume of statistics and reports required from the regulated carriers. The acceptance of this theory has been sufficiently general so that it has been practically considered a commonplace. Like most matters regarded in this light the burden of statistical requirements has been the subject of much comment and criticism. On the whole, however, little, if any, willingness has apparently been shown to do something about it.

The trouble with the whole discussion of statistical requirements is that from the viewpoint of the public and of railway men generally, the problem has never yet been properly set forth. Most people attack the subject with the idea that the discussion is about operating statistics, whereas a bit of thought would remind them that the operating statistics, while important and produced and filed in great volume, form but a small proportion of the total mass of data required by the regulatory bodies. The situation is complicated because so many of those who have authoritatively discussed the requirements as to operating statistics have taken the view that the

amount of data required is not excessive. Some have given their opinion that the operating statistics might, with advantage, be amplified in certain respects.

Not so long since, the Railway Accounting Officers' Association made a detailed study of the operating statistics with a possible view of recommending the elimination of certain of the less necessary statistical units. A careful analysis of the situation brought out the conclusion that but little could be done in this direction. It was shown that the larger part of the material was used by the carriers for their own purposes and that the carriers would continue to compile it whether they were required to report it to the Interstate Commerce Commission or not. The carriers were unable to agree in recommending elimination of any one of the units, because statistics not wanted by some were the very ones that were wanted by others.

It is readily to be seen that it would be entirely incorrect to apply to all statistical requirements these conclusions relating alone to the operating statistics. Nevertheless, that is exactly what has unintentionally been done in most quarters and by many of those who, having given the matter much more than passing attention, should have been expected to analyze the problem more clearly. The result has been that the discussion of the statistical requirements of the regulatory bodies has proceeded on an incorrect basis and, naturally, it has been found impossible to secure results. It is important, therefore, to distinguish between operating statistics and other statistics. We shall get nowhere at all until realization is had that conclusions applying to one do not necessarily apply to the other.

Do the railways have to file too many reports or do they not? There is only one answer to that question and it is in the affirmative. If one has any doubt about it at all, one has only to secure a copy of Bulletin 105 recently issued by the Railway Accounting Officers' Association which contains a tabulation of the reports filed by the Class I railways in 1921. The reports listed include those filed with the Interstate Commerce Commission, the post office department, the treasury department, the geological survey and various other departments of the federal government and it is surprising to see how many of the departments request such reports. About half the list is devoted to reports on every conceivable subject supplied to the various state and local authorities. In small type the list of reports requires six pages, 8½ by 11 in. in size. The *Railway Age* would like to reproduce the tabulation but for the fact that it cannot spare the six pages required. Readers of the paper will not, therefore, have the opportunity—unless they see Bulletin 105 itself—to be afforded the feeling of amazement that goes with studying the lengthy list and realization that such a large portion of our country's wood pulp supply is destined for reports from railways to state and federal bodies of one kind and another.

What is the reason for the publication of this tabulation of statistical requirements at this time? It follows upon a revival of a discussion of this subject that occurred between a committee of the Accounting Officers' Association and representatives of the Interstate Commerce Commission in 1922. The revival of the discussion takes place because of a communication recently addressed to the Accounting Officers' Association by Mark W. Potter of the Interstate Commerce Commission. Mr. Potter seems, if one reads his letter correctly, to have been one of those who unintentionally failed to distinguish between operating statistics and other statistics because apparently he was under the impression that in this whole matter of statistical requirements the carriers, when this matter was previously discussed in 1922, had been unable to agree on any definite proposals for simplification. The accounting officers' reply, supplemented by a memorandum, reviews the activity of the association over a three-year period, and points out that not only did the carriers agree but in 1922 made definite recommendations which, however, did not result in remedy of the burden of undue statistical requirements. The objects sought at that time are tabulated in the letter to Commissioner Potter as follows:

a. Reducing the number of statements and statistics required by the I. C. C. and other commissions and departments of the government—state and federal.
b. Review of the present I. C. C. accounting classification, which work is now under way.
c. Further compacting of present systems so as to permit of the elimination of the great amount of intercompany accounting within each system.
d. Reduction of the requirements with respect to wage statistics.
e. Reduction of the requirements of the Bureau of Valuation.
f. Reduction of the requirements of the Department of Finance.
g. Reduction of the requirements with respect to accident reports.
h. Modification of the requirements as to boiler inspection and other equipment repairs.
i. Changing requirements for the allocation of operating expenses between passenger and freight so that it may be left optional with the carriers. (The I. C. C. now has this matter under discussion.)
j. The co-operation of the I. C. C. to simplify and reduce the requirements of the income tax department for the compilation and furnishing of a certificate and the actual amount of wages earned by every railway employee with the additional data as to address, etc.
k. It was and is still appreciated that the making of special and other reports is expensive, often resulting in duplicate information being furnished which is already in the archives of other departments of the government. In order to keep down this expense, it was and is still respectfully suggested that before any special report or questionnaire is promulgated a conference be had with the proper railway representatives concerned.

When one reads this list of objects one notices the proportionately small amount of attention given to the operating statistics. Attention is directed rather at the wage statistics, the requirements of the income tax department, the requests for special information, the allocation of expenses to freight and passenger traffic, etc. It is apparent that it is in connection with these that one may expect to find greatest opportunity for remedy of the problem. The same conclusion would apply to many of the reports furnished state and local boards.

Worthy of special attention are the monthly wage reports furnished the Interstate Commerce Commission and the Labor Board. The accounting officers have given them such special attention. In February, 1923, the Railway Accounting Officers' Association put itself on record thus:

"It has been demonstrated by experience that the present wage statistics do not meet the requirements of a wage adjustment, and that it is necessary to prepare specific data to meet proposed changes in working rules and rates of pay as they may arise.

"Many of the larger systems have indicated that the wage statistics as now prepared . . . are of little, if any, use or benefit to the railway managements."

The association so put itself on record at that time with reference to certain modifications proposed. It was found that the modifications would not improve the statistics so as to secure the desired results whereas, on the other hand, there would have been a marked increase in cost sufficient to equal $100,000 annually in the case of a representative large system. The modifications were not made.

The requirements of the income tax reports to the treasury department mentioned in item *j* are not an I.C.C. matter but they have proved a most burdensome matter to the carriers. The railroads have to report to the income tax bureau the annual income of every employee earning over $1,000. The work embodied in compiling such data is tremendous and all the more burdensome because one wonders if there are in the treasury department at Washington sufficient employees to use the information after it is furnished. Similar reports are also furnished in various of the states which have an income tax.

Questionnaires and reports for special information have proved a heavy burden. In the case of one questionnaire prepared by the commission in 1922, overtures by the accounting officers resulted in a change in the form such as to effect a saving to the carriers of over $100,000. It is with interest that one reads in the letter also that the commission representatives pointed out that much of the data required in the various reports was called for in specific federal statutes. Congress likes to ask the commission to investigate things and one can readily appreciate that when Congress is in an investigating frame of mind carriers and commission alike

must get busy. Nevertheless, the commission and the carriers working together can accomplish a great deal towards alleviation of the statistical burden and it is unfortunate that more fruitful results were not obtained as a result of the 1922 negotiations.

However, the issue that arose in 1922 has now been revived. It is the natural thing to hope that the discussion, as presently revived, will this time succeed in results. The carriers are required to file an undue amount of statistical information. That they are required to file it is properly considered one of the most important of such evils as exist as a part of public regulation. Public regulation has its value. It could not be properly conducted without statistical information. When we discuss the latter, however, let us be careful that we consider the problem from all angles and not apply to all statistics conclusions that properly belong to one group of statistics or to one group of statistics conclusions that may properly rule with a majority of them.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.

Books and Pamphlets

The Economics of Overhead Costs, by J. Maurice Clark. Chapter 13 is entitled: "Railroads and cost: a statistical study," Chapter 14, "Overhead costs and railroad rate problems," Chapter 15, "The transportation system as a whole." Chapters 18 and 19 also include material of interest to railroad men. 502 p. Published by University of Chicago Press, Chicago. $4.00.

J. Ramsay MacDonald, the Man of Tomorrow, by Iconoclast. As much an interpretation of the Labor movement and what it wishes to accomplish as it is a biography of the first Labor premier of Britain. 286 p. Published by Thomas Seltzer, New York. $2.50.

Periodical Articles

An Analysis of Costs for Ten Years of Fleet Operation, by R. E. Plimpton. Constant costs in motor vehicle operation in the light of experience with steam locomotives, and the factors influencing them. Bus Transportation, March, 1924, p. 138-140.

Britain's Labor Ministers, by Frank Dilnot. "An Engine-Driver as Colonial Secretary" [J. H. Thomas], p. 293. American Review of Reviews, March, 1924, p. 291-295.

The Chester Concession, by Lawrence Martin. ". . . the Chester Project involves the building of railways in an area as large as from Philadelphia to Chicago and from Milwaukee to St. Louis. . ." p. 186. Annals of the American Academy of Political and Social Science, March, 1924, p. 186-188.

Making Mythical Railway Omelets, by Franklin Snow. Brings out hitherto unstressed points in consolidation of railways. Commerce & Finance, March 5, 1924, p. 479-480.

The Railroad Shopmen's Plan, by George Soule. How it has worked on the B. & O. New Republic, March 12, 1924, p. 62-64.

Railways' Needs Vital to the Nation, by C. H. Markham. The president of the Illinois Central believes that opportunities for young men are as great as ever with millions being spent on improvements and betterments. Popular Mechanics, April, 1924, p. 506-510.

Raw Materials and Foodstuffs in the Commercial Policies of Nations, by William S. Culbertson. Transportation as a factor recurs throughout this article. "Railroads of penetration" are discussed in "Water Power and Transportation Concessions," p. 109-113. Annals of the American Academy of Political and Social Science, March, 1924, p. 1-145.

Ties That Bind the Boston & Maine to Bigger Business, by Bernard Peterson. Recent growth in facilities of the B. & M., and a description of its creosoting plant at Nashua, N. H. Boston Evening Transcript, March 8, 1924, magazine section, p. 8-9.

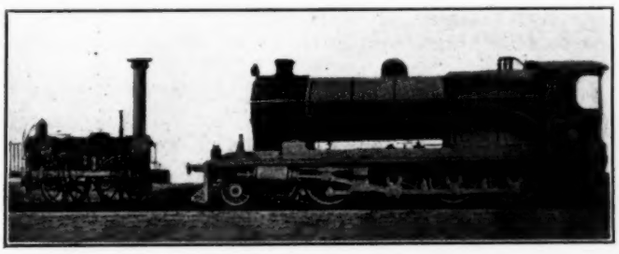
Toot! Toot! Editorial comment on the discussions of how a locomotive should whistle, with an appreciation of those of the Seaboard Air Line. Nation, March 12, 1924, p. 274.

New Books

A Century of Locomotive Building by Robert Stephenson & Co., 1823-1923. By J. G. H. Warren. Published by Andrew Reid & Co., Ltd., Akerside Hill, New-Castle-upon-Tyne, England. 461 pages with over 300 illustrations from original portraits, documents, drawings, engravings, letters, etc., and several plates; size 8 in. by 11 in. Bound in full art linen, lettered in gold. Price 28 shillings.

REVIEWED BY LAWFORD H. FRY

Robert Stephenson & Co. have commemorated their centenary with a volume worthy of their name and traditions. Founded by George Stephenson and his son Robert, two outstanding pioneers in the development of the steam locomotive, the firm has a history which is an integral part of the history of the locomotive, and Mr. Warren has written this history in admirable manner. Drawing largely on original papers in the possession of the families of two of the original partners, he has supplemented these with other contemporary documents. The result is to give the book a great deal of vitality. John Dixon's letter to his brother James describing the Rainhill trials in 1829 in which the "Rocket" established the value



A Comparison Between a Locomotive of 1830 and One of 1903

of the principles of design followed today, and Fanny Kemble's letter describing the Liverpool & Manchester Railway in 1830 are striking examples of the value of the historical method followed.

The greater part of the book deals with the work of the two Stephensons in developing the locomotive and founding the locomotive building industry. It may be said, without undue exaggeration, that the fundamental principles of the modern locomotive were determined in 1829 when Robert Stephenson & Co. built the "Rocket" to meet the demand of the Liverpool & Manchester Railway, then building, for a light high speed locomotive. The success of this locomotive was due to three distinguishing features; the multitubular boiler, suggested by William Booth and constructed by Robert Stephenson; the utilization of the cylinder exhaust to produce draft; and cylinders directly coupled to the wheels. These three elements, still the foundation of the locomotive did not spring full fledged from the brain of a mechanical

amount of data required is not excessive. Some have given their opinion that the operating statistics might, with advantage, be amplified in certain respects.

Not so long since, the Railway Accounting Officers' Association made a detailed study of the operating statistics with a possible view of recommending the elimination of certain of the less necessary statistical units. A careful analysis of the situation brought out the conclusion that but little could be done in this direction. It was shown that the larger part of the material was used by the carriers for their own purposes and that the carriers would continue to compile it whether they were required to report it to the Interstate Commerce Commission or not. The carriers were unable to agree in recommending elimination of any one of the units, because statistics not wanted by some were the very ones that were wanted by others.

It is readily to be seen that it would be entirely incorrect to apply to all statistical requirements these conclusions relating alone to the operating statistics. Nevertheless, that is exactly what has unintentionally been done in most quarters and by many of those who, having given the matter much more than passing attention, should have been expected to analyze the problem more clearly. The result has been that the discussion of the statistical requirements of the regulatory bodies has proceeded on an incorrect basis and, naturally, it has been found impossible to secure results. It is important, therefore, to distinguish between operating statistics and other statistics. We shall get nowhere at all until realization is had that conclusions applying to one do not necessarily apply to the other.

Do the railways have to file too many reports or do they not? There is only one answer to that question and it is in the affirmative. If one has any doubt about it at all, one has only to secure a copy of Bulletin 105 recently issued by the Railway Accounting Officers' Association which contains a tabulation of the reports filed by the Class I railways in 1921. The reports listed include those filed with the Interstate Commerce Commission, the post office department, the treasury department, the geological survey and various other departments of the federal government and it is surprising to see how many of the departments request such reports. About half the list is devoted to reports on every conceivable subject supplied to the various state and local authorities. In small type the list of reports requires six pages, 8½ by 11 in. in size. The *Railway Age* would like to reproduce the tabulation but for the fact that it cannot spare the six pages required. Readers of the paper will not, therefore, have the opportunity—unless they see Bulletin 105 itself—to be afforded the feeling of amazement that goes with studying the lengthy list and realization that such a large portion of our country's wood pulp supply is destined for reports from railways to state and federal bodies of one kind and another.

What is the reason for the publication of this tabulation of statistical requirements at this time? It follows upon a revival of a discussion of this subject that occurred between a committee of the Accounting Officers' Association and representatives of the Interstate Commerce Commission in 1922. The revival of the discussion takes place because of a communication recently addressed to the Accounting Officers' Association by Mark W. Potter of the Interstate Commerce Commission. Mr. Potter seems, if one reads his letter correctly, to have been one of those who unintentionally failed to distinguish between operating statistics and other statistics because apparently he was under the impression that in this whole matter of statistical requirements the carriers, when this matter was previously discussed in 1922, had been unable to agree on any definite proposals for simplification. The accounting officers' reply, supplemented by a memorandum, reviews the activity of the association over a three-year period, and points out that not only did the carriers agree but in 1922 made definite recommendations which, however, did not result in remedy of the burden of undue statistical requirements. The objects sought at that time are tabulated in the letter to Commissioner Potter as follows:

a. Reducing the number of statements and statistics required by the I. C. C. and other commissions and departments of the government—state and federal.
b. Review of the present I. C. C. accounting classification, which work is now under way.
c. Further compacting of present systems so as to permit of the elimination of the great amount of intercompany accounting within each system.
d. Reduction of the requirements with respect to wage statistics.
e. Reduction of the requirements of the Bureau of Valuation.
f. Reduction of the requirements of the Department of Finance.
g. Reduction of the requirements with respect to accident reports.
h. Modification of the requirements as to boiler inspection and other equipment repairs.
i. Changing requirements for the allocation of operating expenses between passenger and freight so that it may be left optional with the carriers. (The I. C. C. now has this matter under discussion.)
j. The co-operation of the I. C. C. to simplify and reduce the requirements of the income tax department for the compilation and furnishing of a certificate and the actual amount of wages earned by every railway employee with the additional data as to address, etc.
k. It was and is still appreciated that the making of special and other reports is expensive, often resulting in duplicate information being furnished which is already in the archives of other departments of the government. In order to keep down this expense, it was and is still respectfully suggested that before any special report or questionnaire is promulgated a conference be had with the proper railway representatives concerned.

When one reads this list of objects one notices the proportionately small amount of attention given to the operating statistics. Attention is directed rather at the wage statistics, the requirements of the income tax department, the requests for special information, the allocation of expenses to freight and passenger traffic, etc. It is apparent that it is in connection with these that one may expect to find greatest opportunity for remedy of the problem. The same conclusion would apply to many of the reports furnished state and local boards.

Worthy of special attention are the monthly wage reports furnished the Interstate Commerce Commission and the Labor Board. The accounting officers have given them such special attention. In February, 1923, the Railway Accounting Officers' Association put itself on record thus:

"It has been demonstrated by experience that the present wage statistics do not meet the requirements of a wage adjustment, and that it is necessary to prepare specific data to meet proposed changes in working rules and rates of pay as they may arise.

"Many of the larger systems have indicated that the wage statistics as now prepared . . . are of little, if any, use or benefit to the railway managements."

The association so put itself on record at that time with reference to certain modifications proposed. It was found that the modifications would not improve the statistics so as to secure the desired results whereas, on the other hand, there would have been a marked increase in cost sufficient to equal $100,000 annually in the case of a representative large system. The modifications were not made.

The requirements of the income tax reports to the treasury department mentioned in item *j* are not an I.C.C. matter but they have proved a most burdensome matter to the carriers. The railroads have to report to the income tax bureau the annual income of every employee earning over $1,000. The work embodied in compiling such data is tremendous and all the more burdensome because one wonders if there are in the treasury department at Washington sufficient employees to use the information after it is furnished. Similar reports are also furnished in various of the states which have an income tax.

Questionnaires and reports for special information have proved a heavy burden. In the case of one questionnaire prepared by the commission in 1922, overtures by the accounting officers resulted in a change in the form such as to effect a saving to the carriers of over $100,000. It is with interest that one reads in the letter also that the commission representatives pointed out that much of the data required in the various reports was called for in specific federal statutes. Congress likes to ask the commission to investigate things and one can readily appreciate that when Congress is in an investigating frame of mind carriers and commission alike

must get busy. Nevertheless, the commission and the carriers working together can accomplish a great deal towards alleviation of the statistical burden and it is unfortunate that more fruitful results were not obtained as a result of the 1922 negotiations.

However, the issue that arose in 1922 has now been revived. It is the natural thing to hope that the discussion, as presently revived, will this time succeed in results. The carriers are required to file an undue amount of statistical information. That they are required to file it is properly considered one of the most important of such evils as exist as a part of public regulation. Public regulation has its value. It could not be properly conducted without statistical information. When we discuss the latter, however, let us be careful that we consider the problem from all angles and not apply to all statistics conclusions that properly belong to one group of statistics or to one group of statistics conclusions that may properly rule with a majority of them.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.

Books and Pamphlets

The Economics of Overhead Costs, by J. Maurice Clark. Chapter 13 is entitled: "Railroads and cost: a statistical study," Chapter 14, "Overhead costs and railroad rate problems," Chapter 15, "The transportation system as a whole." Chapters 18 and 19 also include material of interest to railroad men. 502 p. Published by University of Chicago Press, Chicago. $4.00.

J. Ramsay MacDonald, the Man of Tomorrow, by Iconoclast. As much an interpretation of the Labor movement and what it wishes to accomplish as it is a biography of the first Labor premier of Britain. 286 p. Published by Thomas Seltzer, New York. $2.50.

Periodical Articles

An Analysis of Costs for Ten Years of Fleet Operation, by R. E. Plimpton. Constant costs in motor vehicle operation in the light of experience with steam locomotives, and the factors influencing them. Bus Transportation, March, 1924, p. 138-140.

Britain's Labor Ministers, by Frank Dilnot. "An Engine-Driver as Colonial Secretary" [J. H. Thomas], p. 293. American Review of Reviews, March, 1924, p. 291-295.

The Chester Concession, by Lawrence Martin. ". . . the Chester Project involves the building of railways in an area as large as from Philadelphia to Chicago and from Milwaukee to St. Louis. . ." p. 186. Annals of the American Academy of Political and Social Science, March, 1924, p. 186-188.

Making Mythical Railway Omelets, by Franklin Snow. Brings out hitherto unstressed points in consolidation of railways. Commerce & Finance, March 5, 1924, p. 479-480.

The Railroad Shopmen's Plan, by George Soule. How it has worked on the B. & O. New Republic, March 12, 1924, p. 62-64.

Railways' Needs Vital to the Nation, by C. H. Markham. The president of the Illinois Central believes that opportunities for young men are as great as ever with millions being spent on improvements and betterments. Popular Mechanics, April, 1924, p. 506-510.

Raw Materials and Foodstuffs in the Commercial Policies of Nations, by William S. Culbertson. Transportation as a factor recurs throughout this article. "Railroads of penetration" are discussed in "Water Power and Transportation Concessions," p. 109-113. Annals of the American Academy of Political and Social Science, March, 1924, p. 1-145.

Ties That Bind the Boston & Maine to Bigger Business, by Bernard Peterson. Recent growth in facilities of the B. & M., and a description of its creosoting plant at Nashua, N. H. Boston Evening Transcript, March 8, 1924, magazine section, p. 8-9.

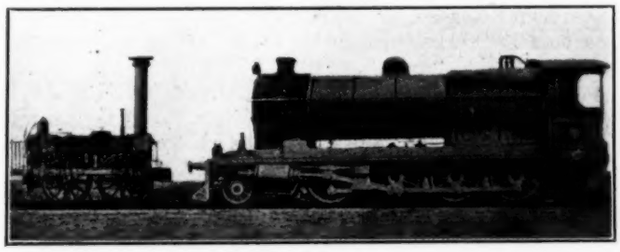
Toot! Toot! Editorial comment on the discussions of how a locomotive should whistle, with an appreciation of those of the Seaboard Air Line. Nation, March 12, 1924, p. 274.

New Books

A Century of Locomotive Bu'lding by Robert Stephenson & Co., 1823-1923. By J. G. H. Warren. Published by Andrew Reid & Co., Ltd., Akerside Hill, New-Castle-upon-Tyne, England. 461 pages with over 300 illustrations from original portraits, documents, drawings, engravings, letters, etc., and several plates; size 8 in. by 11 in. Bound in full art linen, lettered in gold. Price 28 shillings.

Reviewed by Lawford H. Fry

Robert Stephenson & Co. have commemorated their centenary with a volume worthy of their name and traditions. Founded by George Stephenson and his son Robert, two outstanding pioneers in the development of the steam locomotive, the firm has a history which is an integral part of the history of the locomotive, and Mr. Warren has written this history in admirable manner. Drawing largely on original papers in the possession of the families of two of the original partners, he has supplemented these with other contemporary documents. The result is to give the book a great deal of vitality. John Dixon's letter to his brother James describing the Rainhill trials in 1829 in which the "Rocket" established the value



A Comparison Between a Locomotive of 1830 and One of 1903

of the principles of design followed today, and Fanny Kemble's letter describing the Liverpool & Manchester Railway in 1830 are striking examples of the value of the historical method followed.

The greater part of the book deals with the work of the two Stephensons in developing the locomotive and founding the locomotive building industry. It may be said, without undue exaggeration, that the fundamental principles of the modern locomotive were determined in 1829 when Robert Stephenson & Co. built the "Rocket" to meet the demand of the Liverpool & Manchester Railway, then building, for a light high speed locomotive. The success of this locomotive was due to three distinguishing features; the multitubular boiler, suggested by William Booth and constructed by Robert Stephenson; the utilization of the cylinder exhaust to produce draft; and cylinders directly coupled to the wheels. These three elements, still the foundation of the locomotive did not spring full fledged from the brain of a mechanical

genius, but were the result of George Stephenson's 20 years' observation and experience in working with and designing locomotives.

Besides giving an extremely readable account of the influence of the two Stephensons on the development of the locomotive, and the growth of the works they established, the book offers to the reader an unusually clear demonstration of the fact that our modern locomotive owes its form not to the personal ideas of inventors and designers but to the inexorable logic of mechanical conditions. George and Robert Stephenson in laying down the "Rocket" were fortunate in striking the fundamental principles which were essential to the future success of the locomotive, and were clear sighted enough to recognize and to develop these principles in succeeding designs as shown in the "Planet" and the long boiler locomotive. The Planet strain was brought to America in 1831 by a Stephenson locomotive for the Mohawk & Hudson Railroad and is recognizable in Matthias Baldwin's "Old Ironsides."

It is highly instructive to consider the development of the locomotive in England and America and to see how environment has controlled evolution.

One of the most striking things about the early history of English railways is the fact that many of them, the Liverpool & Manchester is an outstanding example, were laid out and built on an elaborate scale before it was definitely decided that they were to be operated by locomotive engines. Civil engineering was highly developed in England and ample capital available for the construction of railways before the steam locomotive had established itself. The account of the Liverpool & Manchester Railway (p. 160 *et seq.*) shows that stone lined tunnels and 90 foot cuts were completed before the directors had decided whether to operate the road with stationary engines and rope haulage or with locomotives. George Stephenson's foresight and determination were largely responsible for the choice in favor of locomotives, and his ability in designing the "Rocket," after the choice was made, completely justified it.

In America the locomotive came before the railroads, and as these were mostly built not to connect large and prosperous cities like Liverpool & Manchester, but to open up undeveloped territories, economy in capital outlay on construction was necessary.

In England the great locomotive builders of the early days, Robert Stephenson & Co., Bury & Co., and later Sharp Roberts & Co., began the development of the locomotive on sound mechanical lines and were mainly responsible for continuance of this development through the critical 20 years from 1825 to 1845. Then as the railroads grew and took up the design and construction of their own locomotives, a greater variety in design appeared. The well built English road-bed made it possible to operate designs and wheel arrangements which have eventually proven to be undesirable, but which lived for a time, because the fact that the locomotives were operated by their designers and builders softened the evolutionary processes by which the less fit are eliminated.

In America, on the other hand, the number of locomotives designed and built by the railroads has always been small, and as a consequence the designs put out have been mainly judged on an impartial basis of results obtained. The comparatively poor roadbed and the sharp and frequent curves of the early American roads gave a rough but ready determination of the mechanical correctness of any design. It is not by chance or as a matter of local fashion that leading trucks, counterbalance in driving wheels, and equalized spring support were first developed and became standards in America.

Of late years the demand for continued growth in size and power of locomotives has increased the difficulties of the problem of locomotive design for the English roads, and as a consequence the number of possible solutions of these problems of design has been reduced. Under the guidance of necessity, the censor as well as the mother of invention, the number of types of locomotives which have survived is comparatively small.

That the civil engineering ability of the early English railroad builders still controls the modern locomotive builder is strikingly shown by the illustration on page 427. Though the weight has increased from 10 tons to 67 tons the total height remains the same. The original construction of the English roads was so substantial that rebuilding to secure greater clearance would have been prohibitive in cost, and the loading gage available remains today practically what it was originally. In America, however, the permanent construction of railroads dates considerably later and as a result a more liberal loading gage is generally available.

A history of the Stephensons must necessarily deal with the use of the blast pipe by George and the development of the link motion under Robert Stephenson. Two well documented chapters cover these questions over which the ink of much controversy has been spilled. The use of the exhaust steam in producing draft had been noted by Trevithick in 1804, and was utilized by George Stephenson from 1814 on, while the contraction of the orifice to increase the effectiveness of the exhaust was due to Hackworth. The Stephenson link motion was developed at the works of Robert Stephenson & Co. by Williams and Howe but the idea of a closed link originated with Williams.

It is interesting to see the records of early tests made in developing the locomotive. In 1812, Hedley experimented to determine the factor of adhesion between driving wheels and rails; Wood and George Stephenson built a dynamometer car and experimented with it to determine train resistance prior to 1825; and Robert Stephenson describes experiments made with the blast pipe in 1829 as follows: "During the construction of the Rocket a series of experiments was made with blast pipes of different diameters, and their efficiency was tested by the amount of vacuum that was formed in the smokebox."

To the student of locomotive engineering the book is interesting. It is a clear record of the early days, when the principles on which we build today were being established, while it also carries a very strong interest in the light it throws on the men who did much of the pioneer work. Among the minor details which lighten the reading, we note that in 1850 the Baltimore & Susquehanna Railroad wrote, as the result of repeated breakage of wrought iron crank axles: "we were induced to try cast iron and after an experience of five years we have adopted them entirely, never yet having broken a cast iron crank axle." It is also noted that the records of Robert Stephenson, about 1830, contain a comparison of the amount of liquor consumed by foremen and draftsmen respectively. Details, however, are not disclosed.

THE PULLMAN COMPANY has recently completed an eight-months' test to ascertain what percentage of errors has occurred among its employees engaged in the selling of tickets. The number of errors per employee was found to be 1 for every 6,818 transactions or 1.2 errors per employee in the eight months. During this period 900,000 tickets were sold in local ticket offices by 233 ticket sellers, employed principally by railroads. The number of telegrams and letters received requesting space was 343,000, while the number of local and long distance telephone calls involved in the assignment or cancellation of reservations was 2,300,000, the number of clerical, telephone and personal transactions involved in the distribution and sale of 900,000 tickets aggregated 3,820,000, or an average of about 4¼ transactions for each ticket sold. The number of duplicate sales and other errors reported by conductors on the above transactions was 467.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

The Careless Crosser

BANGOR, Maine.

TO THE EDITOR:

A man there was who had a car; he drove it day or night; it was a pretty little "boat," with paint all glistening bright.

Our victim was a traveler who toured the country o'er, selling Pillgarlic's liver pads and other things a score. He sailed so smoothly 'long the road, on business all intent, and giving but the slightest heed unto the way he went, that railroad warnings scattered thick, along the main highway (might just as well have not been there) his progress could not stay. But even so, for many moons no accident took place, and through this vale of bitter tears he pushed his smiling face.

Then came a day when from his home he cheerfully did fare. The little car was at her best—he hummed a jazzy air, and thus approached along the road 'cross which the railway ran; but did he heed the crossing signs that bade him stop and scan? Nay. He was thinking of a scheme to sell more liver pads, and framing up, within his head, some clever little ads. So past the signs he gaily whizzed and sensed no coming train; the whistle screeched to no avail, the wigwag wagged in vain. And now he is upon the track; a train is also there; ah, quickly does it happen, dust and wreckage fill the air. The train is stopped with screaming brakes and engine in reverse, the engineer, face pale and set, comes back to see the worst. The little car, so brave and fine e'er this had come about, is lying smashed and upside down, the man, his life gone out, is just an awful twisted heap away there in the grass. . . . But dwell not longer on the scene; one spirit more has passed.

A moral to this little tale should not be hard to find, nor very difficult, indeed, to keep within the mind. Just this: That railroad crossing signs along a fair highway are put there for a purpose and they mean just what they say. So if in safety you would keep, from carelessness decline, and heed, wherever it may be, that "Railroad Crossing" sign.

W. A. R.

Forecasting the Future of Traffic Volume

WASHINGTON, D. C.

TO THE EDITOR:

In an article in your issue for February 9 entitled, "Forecasting Future Volume of Railway Traffic," Mr. John Balch Blood quotes a "prominent authority" as estimating that railway freight traffic in 1933 will be 560,000,000,000 revenue ton-miles, which represents an annual increase of less than 3 per cent from 1923 to 1933. He refers to this estimate as evidencing "stage fright" and a "lack of courage," and sees no reason why, with a previously experienced annual increment of nearly 6 per cent, the next ten years should be forecasted at less than 3 per cent.

The prominent authority against which Mr. Blood directs his criticism is evidently the Special Committee appointed by the Chamber of Commerce of the U. S. A. last year, which made a study of probable railway traffic during the next ten years, and estimated the revenue ton-mileage of 1933 at 560,000,000,000.

The undersigned was a member of the committee responsible for this estimate, and can assure Mr. Blood that the committee took into account the same factors utilized by him, namely, growth in population and growth in traffic per capita. The element of time is a purely arithmetic function of the problem.

The committee first computed the probable growth of population between 1923 and 1933, taking into account not only the probable natural increase, but also the addition to population through immigration, under existing restriction laws. To this estimated population of 1933 the committee applied an estimated increase in the use of railway facilities per capita.

Without going into detail, Mr. Blood can rest assured that the committee did not overlook past experience in its prediction for the future. In estimating population growth and the growth of traffic per capita, the record of past years received careful consideration, and formed the basis for future estimate. Allowance was made, however, for certain tendencies which seemed to the committee to indicate a smaller expectation rate of traffic growth than experience might otherwise have warranted.

Prophecy is at best a thankless task, and the committee may have erred on the side of conservatism. In fact, it frankly stated the belief that its estimates were conservative. But I feel sure that when history records the facts, the committee's estimate of 560,000,000,000 ton-miles in 1933 will be much closer to the actual result than Mr. Blood's estimate of 717,000,000,000.

JULIUS H. PARMELEE.
Director, Bureau of Railway Economics.

The Economics of Track Joint Maintenance

CHICAGO.

TO THE EDITOR:

No chain is stronger than its weakest link. The weakest link in the track structure is the rail joint. This is notorious and has been true for many years.

What are the penalties attributable to this weak link? Low joints, puddled joints, battered rail ends, shortened life of rail, shortened life of joint ties, heavy labor expense attempting to maintain good track under these handicaps; the most important of these, from the financial standpoint, is the last.

These conditions are costing the railroads in the United States and Canada millions of dollars every year in heavy expenditures for labor on the treadmill of constant effort to bring the track back to condition, picking up joints, tightening bolts, replacing bars and so on. With the present high cost of labor and reduced net railway operating income, this is a serious question which is pressing for an immediate solution.

What is the answer? Ask the average maintenance official and he will tell you heavier rail. Why? Because that is the easiest way out. The designs are in most cases already at hand. All there is to do is to pick up the desired section and go ahead and spend the money. No extended research or original development is necessary in the average case. But with the heavier rail we still have the weak link, the rail joint, which is as a rule not much more than half as strong as the rails which it joins. This is no disparagement of the

splendid work performed by the American Railway Engineering Association's committee on Stresses in Track, or of the extensive and valuable work heretofore contributed by several railroads in working out rail sections in a scientific manner. The fact remains that very few railroads are called upon to do work on rail section designs as it is being constantly and increasingly standardized.

On one standard railroad with over 5,000 miles of main track, the records indicate that approximately 2,800 man-hours are expended on track maintenance per mile of main track per year. Authorities on track have expressed the opinion that one-third of the labor expended on track maintenance is attributable to the weakness of the joints, in other words is expended in picking up low joints, etc.

In order to visualize the situation clearly, let us assume that it is possible to design an improved joint of sufficient strength so that one-half of the labor expended on picking up joints can be saved. What would be the result?

	Man-hours
Total labor per mile per year	2,800
Picking up joints, etc. (⅓)	933
Saving, 50 per cent	466

or, roughly, 1½ man-hours per mile per day.

466 Man-hours at 40 cents	per mile	$186.40
$186.40 Capitalized at 10 per cent	per mile	1,864.00
Or, at 320 joints per mile	per joint	5.82

the amount that could reasonably be spent to accomplish this saving, not counting the reduced batter of rail, the reduced wear on joint ties and better track. It is realized that the foregoing figures are only approximations, but it is believed that they are sufficiently correct for the purpose. If the figures don't fit your case, work it out for yourself, using your own figures.

Does it not appear that this is a subject of sufficient importance to warrant the most careful investigation and research to produce a more efficient joint, a joint that will not only save at least a part of the present heavy expense but also at the same time carry us towards that always-to-be-desired goal, better track?

I do not want to be understood as under-rating the desirability of heavier rail. In many cases it is not only desirable but essential. What I wish to emphasize is that the problem of joint design should not be submerged or slighted in the anxiety to increase the rail section. Both are extremely important in the economics of track maintenance.

Heavier rail will cost about $700 per mile for each 10 lb. increase in weight per yard for material only, without including transportation over the home line. In the case of 100 lb. rail which is coming out of track on account of end batter, to secure a 50 per cent increase in strength in the weak link, the joint, by an increase in the weight of rail would require an increase of 50 lb. per yard, or approximately $3,500 per mile. Does not this indicate the importance of trying to secure better joints?

One condition operating against progress in this matter is the failure of executives to grasp fully the amount of labor expended on track and the possibilities of saving in connection therewith. They look upon the labor bill as a necessary evil, something that has always been with us and always will. When it comes to developing and adopting improved track standards, are they not in many cases governed by a policy of excessive economy, due partly to the fact that they are not fully informed as to the actual facts and the possibilities of the situation?

This brings up forcibly the urgent need of establishment by each of the Class I roads of a genuine development or research bureau, such as is maintained by practically all of the large up-to-date commercial manufacturing companies, for scientific research and investigation in the direction of track design and maintenance. This would mean a research bureau with adequate staff devoting full time, undisturbed by other pressing duties, to the technical and economic problems confronting the officers in charge of track maintenance. Possibly the roads could get together and establish a more efficient and comprehensive research bureau at joint expense which could handle these matters for all roads with considerably less expenditure of time and money. The only other alternative is to leave these developments to the railway supply companies and give them sufficient support so that progress can be made.

I realize that the foregoing argument is not bullet-proof. It is simply a picture of the track situation as seen through the eyes of one individual, but it is hoped that it will help to attract attention to what would seem to be a most important subject for contemplation and continued thought.

BETTER TRACK.

Is Winter M. of W. Force Reduction Necessary?

DETROIT, Mich.

TO THE EDITOR:

With the approach of winter the wage earner always faces a serious problem, with the high price of coal, better and heavier clothing, the loss of a garden, etc. The worker who realizes that the first snow means a force reduction and probable loss of employment has an especially serious problem, particularly when he has not been able to save a few dollars from his summer earnings. On the other hand with maintenance of way expenses in excess of half a billion dollars a year the railroads face a problem that is by no means insignificant and one sufficient to justify their desire for a dollar's worth of work performed for every dollar paid out.

It has long been the claim of those responsible for the efficient and economical maintenance of railroad tracks, bridges and structures that work cannot be performed as well or as economically, in the winter. To question the accuracy of this opinion will probably result in a storm of criticism or perhaps those at first tempted to criticise will decide, on further thought, that questioning this long practice is the result of a disturbed brain and think of the questioner sympathetically. Nevertheless I do question the economy and efficiency of drastic winter force reduction in the maintenance of way department. In doing so I hasten to admit that frozen track cannot be surfaced, re-timbered and lined as well as can be done in spring and summer. In fact, I know from practical experience that it is not economical to attempt the performance of this class of work in severe weather. But track is not frozen all winter. In the north it may be most of the winter but in the south it probably is not frozen at all. Yet, the winter force reduction is general, as may be noted from the Interstate Commerce Commission's statistics on the number of employees in service in July as compared with January.

However, the track gang need not be engaged in line and surface work all the time, and this introduces the point I wish to make. Any foreman, supervisor or roadmaster will tell you that when spring opens up and he should be free to jump into his summer work, he is confronted with a lot of other work that should, or at least, could have been done just as well in the winter. The foreman is also confronted with the usual "spring epidemic" of "green men"—men who have had little or no previous experience in maintenance of way work and who have little hope of staying regularly on the job. They have either heard of or experienced the irregularity of employment in this department and in many instances are not inclined to overdo themselves during their brief term of employment.

Let us first consider whether or not there is enough winter work to justify retaining more men in the service, and if so,

whether it can be performed in a way to justify doing the work at that time of the year. This presents a question somewhat similar to Mark Twain's view of the weather. Much has been said about it, but very little has been done about it.

Ties can be distributed as well, if not better, in the winter and will then be where needed when spring work is begun. Track can be gaged and should be put to gage before starting spring work. Fences can be repaired, broken or defective angle bars and rails replaced; bolts tightened, spikes driven down, private and public road crossings repaired, defective frogs and switches repaired or replaced, right-of-way cleaned and scrap and rubbish removed, cuts sloped and ditches cleaned when ground is not severely frozen, soft places in track and fills "rip-rapped," tracks shimmed, ties adzed on curves and turn-outs where rail is turning in, etc. In addition to this kind of work there is always track to be smoothed, sometimes snow and ice to be cleaned away from switches and platforms, and usually a good bit of other work that can be done even though it does not necessarily demand immediate attention. If the foreman is not furnished men for the foregoing work in winter he is compelled to do most of it in the spring and summer when he should be busily engaged in rebuilding his tracks and using to best advantage the new ties, rail and ballast allotted his section.

But there are other important sides to the force reduction question that will, I think, offset the argument that work is not economically performed in cold weather "when the men stand first on one foot, then on the other, beating their hands together to keep warm." If an employee possesses the qualifications necessary to make him a desirable employee and one who appears to have the characteristics of a future foreman, he will, by these same qualifications, think twice before accepting employment with the prospects of being thrown out of work when the snow flies and when a job is most needed. Regularity of employment is important to him just as is the question of wages. Unless a good class of men enter the service the management will see its problem of future foremen becoming more and more serious. How are men of this qualification to be attracted to a job that is only seasonal? Each spring finds good track men settled in other jobs and unwilling to take up track work for the summer because they know only too well "the ax will fall" when the first snow falls. And each spring finds an accumulation of work left undone during the winter that must be taken care of along with the summer work.

If a sufficient number of first-class men were willing to take summer jobs the practice of winter force reduction would not be so bad, but such is not the case as everybody closely connected with the work knows. The railroad's "employee investment" would pay far greater dividends if better men could be attracted with reasonable assurance of steady employment.

In fact, the benefits of continuous year-round employment would be two-fold to the management because it would not only attract better men but would also enable the better class of employees to acquire more skill and experience and consequently would result in more efficient and economical performance of work. Thus, with better men in the gangs, with winter work taken care of as it develops and with the foreman permitted to do his summer work without having a dozen other things to do that should be already done, such as distributing ties and rails and stopping his regular work for this or that, it would be found that more and better work could be accomplished in the spring and summer with fewer men and the increased cost of more winter employees would probably be more than off-set; perhaps not off-set entirely by the actual number of men for the entire year, but by output per man per year and by the rule of a dollar's worth of work for a dollar's pay in wages. I believe that fewer continuous men of a better class would do more and better work than a greater yearly total of irregular inexperienced men.

Another material benefit of a more regular force lies in increased safety. Experienced men are not as apt to injure themselves or others; motor cars could be operated more safely and with less danger of loss of life and property through collisions; obstructions of track could be removed more quickly and guarded more safely by a strict compliance with flagging rules, something that is impossible with less than two men at the very least; and a general reduction of traffic delay, personal injury and property damage would result. Savings in this respect would be difficult to estimate but it is not unreasonable to say that savings would result.

The United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers is interested in the welfare of the railroads because the railroads are a vitally necessary industry and particularly because the brotherhood represents the large army of maintenance of way employees in the United States and Canada. If our department of the industry can be made more efficient and economical we can hope for better industrial conditions for those whom we represent. If we can be of any assistance in establishing a greater degree of efficiency and economy we can expect to share in the savings through improved wages. It is, therefore, suggested that the question of winter force reduction be given consideration and the maintenance of way employees' organization extends its service to any road, or group of roads that thinks there are grounds for improvement in this connection.

L. E. KELLER,
Statistician, United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers.

It's Time to Begin Thinking About Work Trains

TERRE HAUTE, Ind.

TO THE EDITOR:

The handling of work trains economically constitutes a problem that is in the minds of most operating officers early in the season and is given a considerable amount of thought on the start-off of a season's work. However, as the work progresses, in too many cases the work train is lost track of. The crew starts in by getting a few minutes' overtime and this grows until a great deal of overtime accrues and is paid for before it is checked. This overtime, in practically every case, can be avoided and the same results obtained.

With the class of train employees that we are getting in charge of work trains and when two or more are working in the same territory, an assistant roadmaster should be with them continuously to get efficient work and the trainmaster or assistant trainmaster should visit them at least every other day. This close supervision will keep the crews lined up and working in harmony with the engineering, bridge and building or roadway departments. This supervision is necessary at the present time as we have few of the old fashioned work train conductors left. The work for the next day should be fully planned the night before and the subordinate officer in charge should outline specifically to the chief dispatcher exactly where the working limits will be, what work is to be done, where dinner will be taken and other information regarding the operation of the work train that he would be interested in. The chief dispatcher should then leave instructions to his night chief, or his trick men, so that the orders for the day will be ready when the work train crew reports in the morning. Necessary wait orders should be out at that time to enable the work trains to reach their work without being delayed by other trains.

The work train crews should be notified where their work will be and it should be outlined so that they can plan time-saving moves in advance. When work trains are tied up out-

side of terminals, a first-class engine watchman should be provided who has the necessary ambition and intelligence to turn the engine over to the crew with a clean fire and coal on the tank. An engine watchman should be able to coal the engine during the night—by hand, if no other facilities are available.

It is, of course, desirable and economical to provide regular crews on work trains, and attention should be given to the furnishing of a first-class caboose and engine so that men will stay satisfied on the job. If the trainmen are continually changing on work trains, it becomes very expensive.

The work train should be tied up as near the work as consistent. After the first day, the trainmaster should set a stipulated time for quitting and getting tied up and insist that it be adhered to. This plan will discourage loafing by the crew after the day's work is finished. A sufficient number of workmen should be kept with the work train to keep the work moving. They should be in charge of a competent lead man. Many times a work train is wanted for one day only. Before this work train is authorized, the person in authority should satisfy himself that it is needed as too many times a work train is ordered without enough work to pay to run it. It is best if the work is not urgent to hold it up until two or three days' work can be furnished the crew.

The handling of wreck trains is a source of expense and they can be handled more economically in the following manner if the derailment is a large one and considerable distance from a terminal. When the wreck train leaves a terminal, deadhead an entire crew with it and work the crews eight hours. They will greatly reduce the expense, permit continuous operation of the wreck train and eliminate a lot of worry relative to the hours of service law.

Power suitable to handle the work should be furnished. Nothing is gained by furnishing a small engine on a heavy job, while if the job is heavy, large power should be furnished. If the job is light with a lot of short work and running around, light power should be applied. Stoker engines should not be used on work trains. Traveling engineers should make regular visits to work train crews and see that they have necessary supplies and that power is in good condition. When at any great distance, the changing of engines for washouts can be accomplished by changing off with way freight crews and save running into terminals on Sunday. During summer months an engine at an outlying point on work train can be killed Saturday night and re-fired Monday morning.

N. A. RYAN.
Assistant Superintendent, Chicago, Milwaukee & St. Paul.

The New Operating Expenses Classification

PHILADELPHIA, Pa.

TO THE EDITOR:

I have read, with interest, the articles upon the proposed operating expenses classification written by "Assistant Comptroller," appearing in the issues of February 2 and 16, and on many features I would like to compliment him. His chief criticisms appear to be directed to the difficulty of making comparisons with previous years results.

The revision of the classification of operating expenses was undertaken as a means of reducing the clerical labor of performing this distribution. While the reduction in the number of accounts will reduce the expenses to some extent, the greater part of the saving expected was in the matter of the elimination of distributing bills, vouchers, pay rolls, and other original sources of expenditure over several primary accounts. Also in the elimination of prorating over the primary accounts amounts charged originally to clearing accounts such as "Shop Expenses," "Store Expenses," etc.

The author of the articles mentioned above in the issue of February 2 stated that he would suggest some modifications of the tentative revision which he believed would lighten the burden of analysis that destroys the advantages of the revision in the way of simplifying the accounting. In his second article, however, he has provided for the apportionments referred to above, which in the writer's opinion are the cause of a large amount of clerical labor which should be avoided.

Referring specifically to the matter of comparisons, it is suggested that the present operating expenses of carriers cannot be compared, either by primary or general accounts, with those of 1919, or any year prior thereto without extensive explanations. The changes in rates and in wages and working conditions on the railroads, and the decreased purchasing power of the dollar as reflected in the cost of labor and material due to the world war, have so altered conditions that comparisons with preceding years are liable to be very misleading. In fact 1923 is about the first approach to a normal year for the railroads since 1916.

With this thought in mind it seems to me the railroads of the country should embrace the opportunity of approving a classification of operating expenses upon a basis that will furnish the executive and operating officers information in much better form than heretofore presented from which to judge the efficiency and economy of operation. The classification as suggested primarily by the railroad accountants and presented by the Bureau of Accounts is, I think, the greatest step forward since 1907 when the first authoritative classification was issued. It recognizes that railroad expenses cannot be properly controlled unless a budget is adopted in advance, limiting the amounts that can be spent for labor, materials, fuel and miscellaneous items. To assist that object, it would reduce the primary accounts from 191 to about 91, and it provides for the direct charging to one proper primary account of practically all the expenditures made in operating a railroad that belong to that account, but due latitude is given to carriers to subdivide the primary accounts each in their own way as conditions might warrant, or seem necessary, on their respective lines.

With the separation of the accounts as between labor, material, fuel and miscellaneous items, a practical analyst would have no difficulty in exhibiting the production for the expenses incurred. The separation of the general accounts by departments lends itself very readily to the organization of carriers generally and would lend itself to the "budget system" of controlling expenses which is the practical method by which railroads are operated and maintained, and not primarily by an historical classification of operating expenses under 191 separate primary accounts. This budget system of control will, within a few years, become universal and the classification should be made with this in mind. Economical and practical accounting demands that all cross billing or cross charging between departments of the same railroad of items of labor, supervision, materials, fuel and miscellaneous items, should be avoided as much as possible. The tentative revision presented by the Bureau of Accounts carried out this idea as far as it seems possible at this time.

I hope to find the executive and accounting officers agreed as to the advisability of making wholesome revisions at this time, having in mind the underlying purpose which is the reduction in the clerical work and records involved in distributing operating expenses. The carriers have realized that clerical expense has been increasing in an unusual degree in the last 10 years, and while it is by no means occasioned by the accounting departments, it is spent in making reports, records and statistics to meet the increasing regulation and legal requirements of all kinds and it is largely unproductive. This proposed revision is one step towards the reduction of that expense.

A. J. COUNTY,
Vice President, Pennsylvania Railroad System.

Automatic Signals for a Railroad Grade Crossing

Satisfactory for Thin Traffic; Home and Distant Signals Arranged on the "Normal Danger" Plan

ONE COLD DAY in December, 1921, at the crossing of the New York Central and the Lackawanna railroads, near Utica, N. Y.—Signal Station "W U"—the instruments on the signalman's desk in the interlocking cabin burst into flames, from a 4,000 volt current which entered the building on a telegraph wire that had become crossed with a power wire in the city of Utica, about half a mile away. So quickly did the fire spread that the signalman was unable to get his shoes from under the desk, and was forced to rush in his stocking feet through the snow to a telephone to notify the fire department.

As the rebuilding of the interlocking and the construction of a fireproof brick building would be costly, and as all of the nearby switches might satisfactorily be operated by hand, it was decided to do away with the interlocking and to put in automatic railroad grade crossing signals; and thereby save the $3,500 annual wages paid to signalmen to operate the machine.

Hall "Searchlight" Signal

The details of the arrangement to be used for the protection of the crossing by automatic signals were decided upon in conference between Chief Engineer C. R. Vanneman of the Public Service Commission of the State of New York, and the signal engineers of the Lackawanna and the New York Central roads. On the plan being agreed upon and application made to the Commission by the two roads, formal approval for the installation of the crossing signals was given and the reconstructed signal arrangement was completed and placed in service on January 30, 1923, since which time it has worked with very satisfactory results. Slight constructive defects developed with the alternating-current, motor-operated semaphore signal mechanisms which were used, and some trouble was experienced with the bonding of the rails for propulsion current. With these exceptions the arrangement has worked with reliability and with greater efficiency than a manually operated interlocking.

It has been shown that at railroad grade crossings where there are no switches, or where switches may satisfactorily be operated by hand, as in manual block signal territory, the arrangement gives all the protection necessary at a crossing to permit trains of either road to proceed across the other without stopping.

Plant to Be Installed at Helena, N. Y.

In consequence of this satisfactory experience, the New York Central, with the approval of the Canadian National Railways and with the approval of the New York State Public Service Commission, has arranged for the installation of automatic railroad grade crossing signals at Helena, St. Lawrence County, N. Y., where the New York Central's line to Ottawa, Ont., crosses the Canadian National (the Massena branch of the Grand Trunk). This plant is here described.

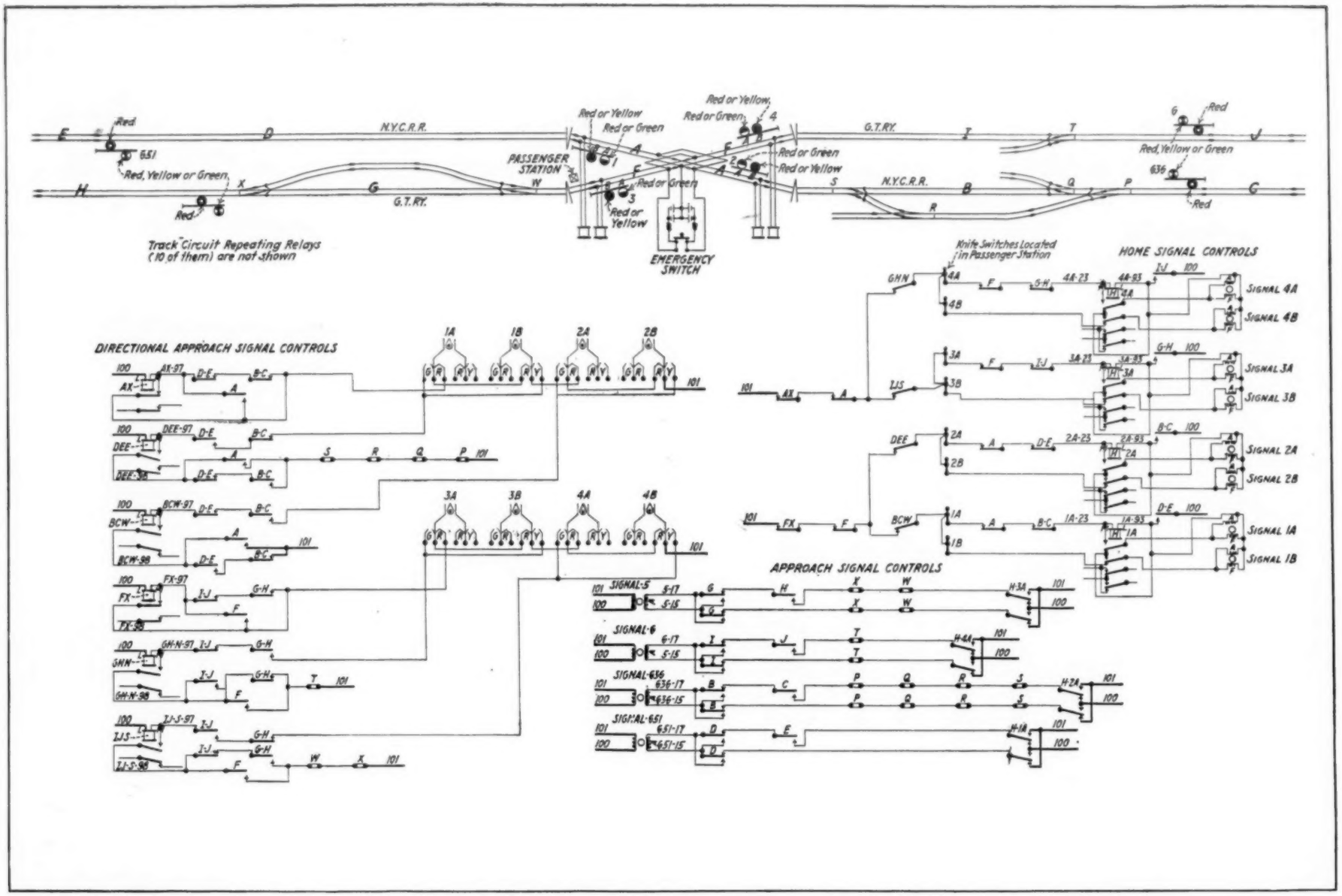
The Pennsylvania has agreed with the New York Central for the substitution, as soon as plans have been prepared, of similar crossing signals for the mechanical interlocking now in use at the crossing of the two roads at Madera, Pa. Madera is in the wilds of the coal regions, 20 miles north of Altoona.

In view of the greater reliability of colored light signals as compared with motor-operated semaphores, and the elimination of moving parts which may cause false clear indications, the New York Central has decided that for future installations of automatic railroad grade crossing signals colored light signals shall be used. This type of signal is, therefore, to be put in at Helena. It is the Hall single-light signal, with movable roundels, described in the *Railway Age,* January 14, 1922, page 186. The appearance of a single signal is illustrated herewith. (At Helena, double signals are used, as indicated in the drawing).

As light signals lack the convenient circuit controllers of the semaphore apparatus, the circuits for Helena are materially different from those at the crossing in Utica, where semaphores are used. The control is as flexible and as reliable as that obtained with the semaphore and there will be more efficient working. With light signals, the only moving parts will be those of the relays and the electro magnets of the signal mechanisms; and with current supplied from 1,000-ampere-hour primary batteries, the arrangement should be safe, reliable, efficient and economical; and easy to maintain.

A typical plan of the arrangement of signals to be installed at Helena is shown in our full-page drawing, for which we are indebted to W. H. Elliott, signal engineer of the New York Central. As a complete circuit plan is somewhat difficult to follow, this is a partial plan, designated to show the typical and principal controls to be provided. It is to be noted that signals of two lights (home signals) are provided to govern movements over the crossing (signals 1, 2, 3, 4) and each home signal has an approach signal. The approach signals (651, 636, 5, 6) are three-indirection. The home signal has but two indications, displaying green or red above and yellow or red below. Marker lights (red) for the approach signals, although shown on the plan, will not be used on the Canadian National signals.

As noted, this is not a complete plan; and the tracks are



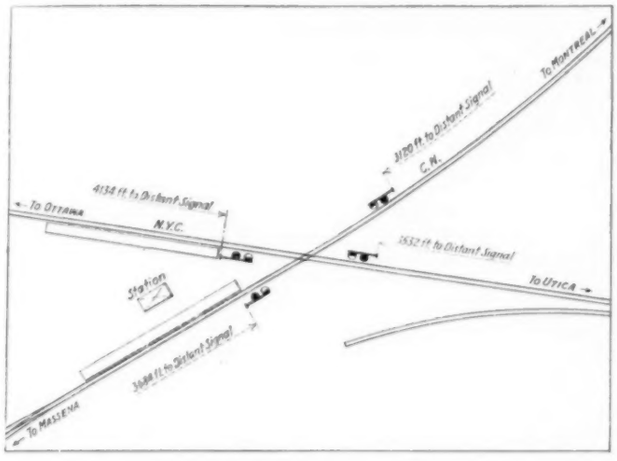
Automatic Signals for a Grade Crossing, Helena, N. Y.—Typical Circuits

not drawn to scale. The actual location of the tracks of each road, as related to those of the other road, is indicated in the small sketch.

Circuit Conditions

The circuits are arranged to permit the first train coming on to an approach lighting or preliminary clearing circuit, to proceed over the crossing under clear signals; and by its presence to arrange the circuits for the other road so that the signals on that road will indicate (provided a train approaching on that road has entered the approach lighting circuit, making it possible to energize the signal lamps): at the distant signal, *caution*—approach next signal prepared to stop—and at the home signal, *stop*.

When no train is *approaching* the crossing, all lights are de-energized—dead. Even with a locomotive or a car standing on the crossing, and by its presence there making the electrical contacts at the signals of the other road necessary to protect itself from trains on that road, the signals of the other road do not light up until an approaching train needs them.



Crossing at Helena, N. Y.

Should two trains on the same road approach the crossing running from opposite directions, the first train to run on an approach lighting circuit will cause clear signals to be displayed for itself—green by the upper light on the approach signal and green by the upper light on the home signal. Then, when the train moving in the opposite direction runs on the approach lighting circuit on its side of the crossing, it will cause signals to be displayed for itself as follows: in the approach signal a yellow over a red light, and in the home signal a red over a yellow light; and the signals for the other train—the one which approached first—will also be made to display these same indications. Thus each train, as soon as two are approaching together, from opposite directions, sets a caution (slow-speed) signal against the other one. These indications having been displayed, switching movements may be made in either direction, on that one line, over the crossing, without flagging.

If any of the track circuits of one road are occupied by a train, the signals of the transverse road will be made to display proper indications to cause a train on that road to stop at the crossing; and the train cannot get a signal to proceed until the train on the road first occupied has gone over the crossing and its rear end has cleared the crossing track circuit. On the rear end so clearing, the home signal of the other road will at once indicate "Proceed," to permit the other train to proceed over the crossing. As long as the crossing track circuit (which is only about 150 ft. long), or the track circuit for an approach to the crossing, is occupied by a train, the route is held for that train. The train gives up the route only when its rear end has passed over the crossing and is clear of the crossing track circuit.

The circuits have been arranged to provide direct control by relay for each signal indication, except where it is necessary that control be had through the contacts of the signal relay mechanism. The mechanism contacts are operated by a cam on the armature shaft, according to the direction in which the armature is turned, to cause a yellow or a green light to be displayed. These contacts on the signal mechanism are the means by which signals of the transverse road are held at stop, when either of the home signals of the road first occupied indicates proceed.

The Principal Circuit Combinations

Track circuits are of the end fed type, except "A" and "F," which are center fed, having a relay at each end. The track battery is controlled through a knife switch located conveniently at the crossing. In accordance with a card of instructions this knife switch can be used, in case of signal failure, by the conductor of any train which cannot get a proceed signal, to set signals on the other road at stop, so as to permit his own train to proceed over the crossing.

Relay AX is of the stick type, the pick-up of which is controlled through the front contact of track relays "D," "E," "B" and "C" and through contacts on signals 1A, 1B, 2A and 2B, made only when the signal displays a red indication. The control through track circuits "D," "E," "B" and "C" is shunted out through a back contact on track circuit "A." The purpose of this relay is to hold the crossing signals on the Canadian National in the stop position, when a train is approaching the crossing in either direction on the New York Central, and the N. Y. C. signal displays an indication to proceed over crossing.

DEE relay is of the stick type, normally de-energized. The pick-up is controlled through the back contact of the D-E relay, through front contact of B-C relay, through circuit controller on signals 1A and 1B in multiple, made only when signals display green or yellow. The circuit holding the relay energized is controlled through front contact of D-E relay, back contact of B-C relay and through switch circuit controllers on switches "S," "R," "Q" and "P." The control through relays D-E and B-C is shunted out through a back contact on the track relay for Section A. The control provided by these relays is designed to release the route for a train to pass on the transverse road when the rear of a train on the road first occupied passes over and off of the short crossing track circuit, it being necessary, in order to accomplish this, to keep the signal on the first road from clearing for a movement in the opposite direction.

Signals No. 5 and No. 6, and signals 636 and 651 are the approach signals for trains coming from, respectively, Massena, Montreal, Utica and Ottawa. Energy is applied to the field side of the mechanism at all times. For the control on the armature side, energy is taken through pole-changing contacts on the H relays for the home signals of the tracks governed. The control is then through all switch circuit controllers and track relays between the approach and the home signals and through the approach lighting relays. When a home relay is de-energized, current flows in the direction causing the approach signal to display yellow. When a home relay is energized, current flows in the opposite direction causing the approach signal to display green.

Signals 1A, 2A, 3A and 4A are home signals. The operating coils of these signals are controlled through H relay, and through all track circuits and switches in advance of the signal, including the approach clearing circuits in the opposite direction; through track circuits between the home signals on the transverse road, through a knife switch in the passenger station at the crossing and through back contacts of stick relays, "BCW," "DEE," "IJS" or "GHN" respec-

tively. Signals 1B, 2B, 3B and 4B are controlled through back contact of H relays, through knife switches at passenger station, through back contact of "BCW," "DEE," "IJS" and "GHN" respectively; through the track circuit of the transverse road between home signals, and through AX or FX relays. The armature and field coils for each home signal are in multiple. When H relay is de-energized, a shunt is provided on "A" signal through back contact. A shunt is provided for "B" signal through front contact of H relay. The H relays are normally de-energized, being energized through back contact of track-circuit repeating relays, when a train enters an approach clearing section.

Space-Interval Operation

The home signals, in addition to the automatic controls, are controlled by knife switches, operated by the station agent for manual block operation. A knife switch is provided for each home signal, so that when the block extending to the next station is unoccupied a train may be allowed to pass into the block on a green indication of the top signal. When the block is occupied a train may be permitted to enter the block on a yellow indication of the lower signal. Thus by the use of the knife switches the station agent has a complete block signaling outfit. A train for Ottawa, for example, having departed from the station, signal A2, by means of the knife switch, is held at stop (red) until the train reaches the next station.

Track relays are to be of the Hall gauze contact type with batteries of 1,000 ampere hour caustic soda type. Signals are to be of the three-position Hall color-light type, having armature resistance of 250 ohms and 500-ohm field coils.

If a signal governing a movement over the crossing does not clear when it should, it is necessary for a trainman to go to the crossing and, after ascertaining that no trains are approaching, unlock a box and open the two-way single-throw knife switch which cuts the current off from the two track circuits that cover the crossing, thus setting at stop the controlling signals on both roads; after which the train may be moved over the crossing under protection of a flag. The bulletin prescribing the practice to be followed in such a case, is worded as follows:

> "A signal indicating stop may be passed only on hand signal from trainman standing on crossing. Trainman must, before giving hand signal, observe that no train is approaching on any track, and then only after he has unlocked box at crossing and opened crossing switch. After train passes, crossing switch must be closed and box locked."

The same process may be followed in case a train on the other road, having the right to the crossing, is standing at the home signal, and is willing to relinquish its right.

As it is desirable that the track circuits of the crossing be as reliable in their working as it is practicable to make them, the home signals are placed as close to the fouling point at the crossing as the local conditions as to rail joints, switches, platforms, etc., will permit, 50 ft. being prescribed as the minimum distance. With the signals so located and derails not being used, the crossing track circuits are of a minimum length; and with relays at each end of each circuit there is small chance that the relays will fail to operate to cause the home signals to indicate stop whenever the crossing is occupied.

As the approach signals are located braking distance from the home signals for the maximum speeds authorized on these divisions, trains receiving proper signal indications will not be required to reduce speed below that prescribed for a crossing protected by interlocking signals. From an operating standpoint the arrangement is as efficient for through movements as any other system of signals; and where switching movements are to be made, within the track circuit limits, it provides block signal protection with a promptness in the display of signal indications that may be had only from apparatus that is automatic in operation.

For the benefit of the reader who is not familiar with automatic signals it may be explained that when a train or any part of it is moving or standing on a section of track, in the rails of which the electric current of the signal system is flowing, the signals which notify all other trains to keep off that section of track are automatically set at "stop." The presence of the wheels of the cars de-energizes one or more electro-magnets; and the electro-magnets act to move all signals—one or many—on all conflicting tracks or routes to indicate "stop" to approaching trains.

The light signals are electric lights, properly hooded, so that they are seen by the engineman in daylight as well as at night; and in this case the circuits controlling them are extended to a point about a mile back of the approach signal and there controlled by a track relay so that the lamps are *never lighted* except when a train comes on to the rails of the lighting section. Thus each approaching train lights its own signals a proper distance ahead; though, of course, these signals are potentially energized by the absence of any train of the transverse railroad on or approaching the crossing.

In the drawings the track circuit limits are indicated by thick spots in the lines which show the rails.

The color-light indications are: red for stop, yellow for caution and green for proceed.

The Hall light signals differ from other light signals in that there is only one lamp for all three colors, an armature of very light weight serving to change the colors by moving small, thin roundels to position in front of the lamp. The roundels are 1 in. in diameter and 1/16 in. thick.

Station at Kyoto, Japan

Equipment Repairs Burdened Railways in 1923

Condition Now Best in Several Years—Will Result Be Decreased Costs for 1924?

In 1923, although the railways moved a record-breaking traffic they did not succeed in earning the 5¾ per cent on their tentative valuation, which the Interstate Commerce Commission has determined to be reasonable. The Class I carriers actually earned a net operating income of $997,543,590, equivalent to 5.10 per cent on their tentative valuation. In 1922, they had a net operating income of $776,880,592, equivalent to 4.14 per cent. In 1923, as compared with 1922, there was an increase of 21.7 per cent in net ton-miles and an increase of 13.1 per cent in total operating revenues. Total operating expenses increased 10.9 per cent, expenses for maintenance of way 11.6 per cent and transportation expenses only 8.0 per cent. On the other hand, expenses for maintenance of equipment were in 1923 no less than 17.1 per cent greater than in 1922. In other words, the increase in expenses chargeable to this account was disproportionate to the increases in other expenses.

Fig. 1—Number of Locomotives Repaired

This factor of the disproportionate increases in maintenance of equipment expenses has already received extended comment in the columns of the *Railway Age*. This article is an amplification of an article entitled, "Equipment Maintenance Out of Proportion," which appeared in the *Railway Age* of December 22, 1923. In that article consideration was given, among other things, to the abnormal maintenance of equipment expenses of 1923. The conclusion was drawn that the reason was the costs incident to making up for the shopmen's strike of 1922 and to meeting the standards of equipment condition established by the A. R. A. 1923 transportation program. The point was made that the maintenance of equipment expenses in 1923 included costs of maintenance that should properly have been charged to 1922, or even to 1921, or 1920. It followed that if it were true that the 1923 maintenance of equipment costs were exaggerated, lower costs might be expected for 1924, now that equipment is in excellent shape and the work of catching up on deferred repair work is accomplished. Were these conclusions correct? Are they susceptible of further proof?

Good Tools to Work With

Most observers who have made a careful study of railway operating conditions in 1923 have reached the conclusion that one of the principal reasons, if not the principal reason, for the operating efficiency secured during the year was the splendid condition of railway equipment. This view does not in any way detract from the honors due, for instance, to the transportation department. The idea is best expressed by saying that the transportation department—the department that actually moves the trains—was measurably assisted in the work it was called upon to do by being afforded efficient tools in the form of locomotives and cars in unusually good average condition. The equipment was put in this condition as a result partly of the acquisition of a large number of new cars and locomotives and—as evidenced by such figures of shop activity as are available—as a result of extraordinary activity in the railway repair shops. The essential point is that this activity was not done free of charge. It cost a great deal of money and its cost was charged to maintenance of equipment expenses. That, in the last analysis, is the real reason for the expanded maintenance of equipment expenses of 1923.

The railway shopmen's strike began on July 1, 1922. It lasted on some roads until the middle of September; on others that refused to settle with the men well into 1923. The railroads made some small preparations towards meeting the strike, but the expectation at the time was that no strike would be called, and the preparatory measures were not extensive. Throughout the first half of 1922, locomotives unserviceable averaged about 23 per cent and bad order cars about 14 per cent. This high proportion of unserviceable equipment evidenced that equipment repairs had gotten behind. The equipment condition up to that time had not been restored from the situation in which it was found on the return of the roads to their owners after federal control and in the case of cars, on their return to owning roads after their dispersal to the four winds as a result of the pooling arrangements of the federal control period.

The reason that restoration of condition had not been brought about was a matter of lack of time partly and to a greater extent it was due to the lack of funds for equipment repair work during the business depression of 1921. As a result of the shop strike further deterioration in equipment condition resulted. Conditions were at their worst about September 1, 1922, on which date, according to the Car Service Division reports, 25.3 per cent of the country's locomotives were held for repairs requiring over 24 hours and 14.8 per cent of the cars were in bad order. Little repair work was done in either July or August, but from that time on shop forces were gradually recruited and marked improvement had been effected before the end of the year.

Marked Improvement in 1923

On January 1, 1923, locomotives held for repairs requiring over 24 hours numbered 13,587, or 21.1 per cent. Bad order cars totaled 216,011, or 9.5 per cent. It was during 1923 that the real progress was made. On January 1, 1924, locomotives held for repairs requiring over 24 hours totaled

9,395, or but 14.6 per cent; bad order cars 158,175, or 6.9 per cent. There was thus during the 12 months of 1923 an improvement in the equipment condition such that there were at the end of the year 5,000 more locomotives in serviceable condition than at the beginning of the year and 70,000 more serviceable cars.

Admitting that part of this improvement was due to the installation of new equipment and that considerable old equipment was retired and written off the books, it still remains true that a large share of the improvement was due to an extensive repair program. It should appear from the foregoing that this repair work accomplished two purposes. First, it finally enabled the railways to catch up on the delayed repair work of 1920, 1921 or the early part of 1922. Second, it represented the work necessary to counteract the effect of the shopmen's strike. This is the reason for the assertion that the heavy maintenance of equipment costs of 1923 represent costs that properly should have been charged to the years 1922 or even 1921 and 1920.

In 1923, the railways earned a net operating income equivalent to 5.10 per cent on their property investment. If they had not spent so much money for equipment maintenance as they did, it is not impossible that they might have been able to earn the desired 5.75 per cent. That, however, is pure surmise. The money was spent to put the equipment in good shape. If the equipment had not been put into good shape, it is difficult to believe that transportation costs could have been kept down or the traffic handled in the volume in which it was handled. It is a case, therefore, of maintenance of equipment costs being expanded to bring about reduction of transportation costs. Furthermore, the net operating income of 1922 was at a rate of 4.14 per cent; that of 1921 at the rate of 3.33 per cent; that of 1920 at the rate of but 0.32 per cent. These rates of return were low—but they would have been lower still had they included at that time the cost of such of the equipment repair work as was not finally accomplished until 1923. Those who believe that the railways spent more money for maintenance of equipment in 1923 than they should have spent may well bear this in mind. It is important.

Cost of Shop Crafts' Strike

No one has attempted to evolve an accurate figure purporting to represent the cost of the shopmen's strike of 1922. Some of that cost was reported in the operating expenses of 1922; much in the expenses of 1923. Total maintenance of equipment expenses in 1922 were about the same as they were in 1921, the figures being as follows: 1921, $1,251,479,444; 1922, $1,252,517,250, and 1923, $1,474,931,328. As between 1922 and 1921 there was a decrease of about $9,000,000 in the item of locomotive repairs and a decrease of about $59,000,000 in that of freight car repairs. On the other hand, however, there was an increase of $53,000,000 in the item of "Other Expenses," the 1921 charges to this account being only $625,096, whereas those in 1922 were $53,591,348. This item might properly have been termed "Strike Expenses" but for the fact that it included only part of the total expenses due to the strike. A large share of the strike costs will be found in the repair accounts. In truth, a fair share of them might properly be included in the transportation accounts as a result of the difficulties to operation following from a poor equipment condition.

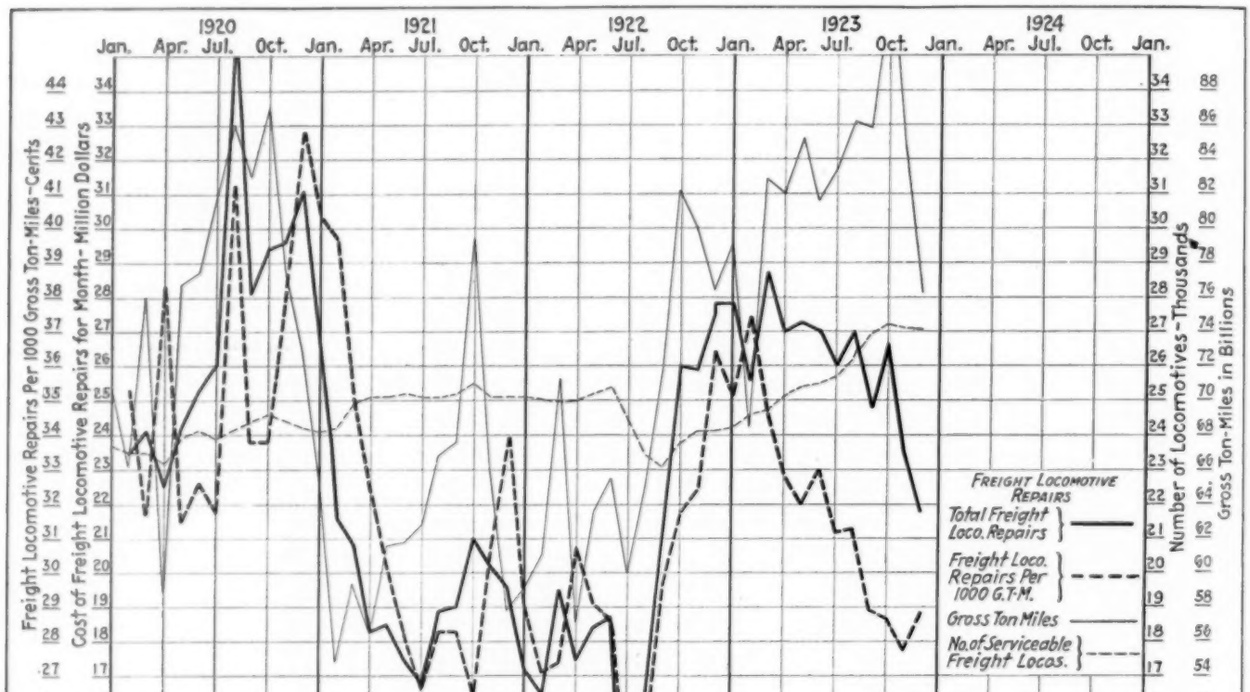

1920
1921
1922
1923
1924
Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan.
Freight Locomotive Repairs Per 1000 Gross Ton-Miles-Cents
Cost of Freight Locomotive Repairs for Month-Million Dollars
Number of Locomotives-Thousands
Gross Ton-Miles in Billions
FREIGHT LOCOMOTIVE REPAIRS
Total Freight Loco. Repairs
Freight Loco. Repairs Per 1000 G.T.M.
Gross Ton Miles
No. of Serviceable Freight Locos.

Fig. 2—The Trend of Locomotive Repair Costs

When the 1923 figures are available in complete form the item of "Other Expenses" will probably be found to be fairly large, although nothing like as large as the $54,000,000 charge of 1922. This does not mean that the 1923 maintenance of equipment costs will not include what are properly strike expenses. As far as 1923 is concerned, the charges will be found in the repair accounts, for here are included the charges for repair work that should have been carried out in 1922 but was not because of the strike.

Comparison of equipment condition percentages as of the

first of 1923 and as of the end of the year are vitiated to some extent because of the large installations and retirements of equipment during the year. The number of new locomotives installed was the largest since 1913. From the standpoint of tractive effort, the installations were the largest in history. The installations of new freight cars both from the standpoint of number and carrying capacity were similarly the largest in history. In the statistics of locomotive or car condition the installation of a new unit or the retirement of an old unit has the same effect as the repair of a unit would have.

On the other hand, we have a statistical unit in the Car Service Division reports of locomotives turned out of shop. The monthly figures are plotted in Fig. 1. Unfortunately, light and heavy repairs were not shown separately until June 1, 1923. However, the chart shows that the repairs in the latter part of 1921 ran about 22,500 monthly and continued at that rate until June, 1922. In July and August, 1922, the shops were idle and repairs totaled only about 15,000 for each of the two months. They then began to increase month by month as the effects of the strike were overcome. In January, 1923, they totaled 38,000, and throughout the most of 1923 they ranged about 40,000 monthly, reaching in August a total of no less than 43,000. This chart is especially significant as far as it goes. It does not give as good a picture as could be presented with the Car Service Division's new data wherein locomotive repairs are separated by classes of repair.

It is unfortunate that we do not have as good figures for car repairs. Figures relating to car repairs date back only to June 1, 1923. They are divided between light and heavy repairs, heavy repairs averaging about 120,000 monthly. The statistics relating to locomotive repairs are much more complete than those relating to car repairs. There is much room for improvement in connection with the latter and such improvement would give the analyst much useful information.

Locomotive Repair Statistics

An interesting and useful source of locomotive repair statistics is contained in the monthly reports to the Interstate Commerce Commission in the form of the report of freight and passenger train unit costs. These statistics were originated by the Operating Statistics Section of the United States Railroad Administration and continued by the Interstate Commerce Commission in its Form OS-C-Locomotive and Train Costs. The data is shown in the form of cost per freight-train-mile and cost per 1,000 gross ton-miles for freight service and cost per passenger-train-mile for passenger service. The selected items include: Locomotive repairs; engine house expenses; enginemen, trainmen, fuel, other locomotive and train supplies, totaled to form the item of total selected accounts. It will be noticed that car repairs are not included.

For the purposes of this article, there have been charted

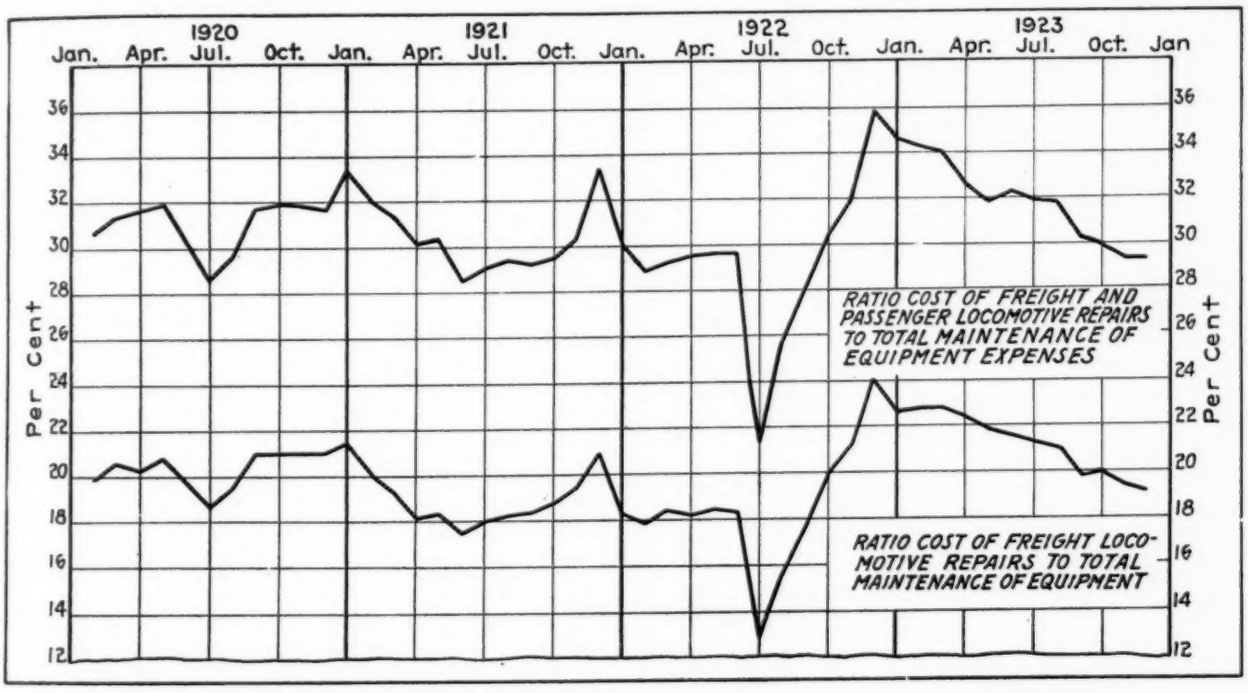


Fig. 3—The Ratio of Locomotive Repair Costs to Total Maintenance of Equipment Expenses

in Fig. 2 a selection of the figures from these and related reports. The chart shows the data relating to freight train service by months from January, 1920, to December, 1922, as follows: (a) locomotive repairs per 1,000 gross ton-miles; (b) gross ton-miles; (c) the total cost of freight locomotive repairs for the month, and (d) the average number of locomotives in serviceable condition during the month.

It will be seen from this chart that up to the beginning of 1923 there was a fair movement in synchronism of cost per 1,000 gross ton-miles, total freight locomotive repairs and volume of traffic. This means that freight locomotive repairs both in total and per unit showed a tendency to decrease with declining traffic volume and to increase with increased traffic. This is what would be expected because railways are more able or willing to spend money for maintenance when business is good and effect retrenchment when business is poor. It is not without significance in this connection that in the period charted—except in recent months—the increase or decrease in expenses trailed rather than led expansion or contraction in business volume.

There are certain exceptions in the chart to the general movement in synchronism. Locomotive repair costs in 1921 were low. In October of that year costs per 1,000 gross ton-miles decreased whereas traffic increased. As a result the unit cost of freight locomotive repairs was the lowest for any month during the year, while gross ton-miles were the great-

est. May this not be an indication of the manner in which the railways kept their charges for locomotive repair work during 1921 at the lowest level that conditions permitted.

The shopmen's strike of 1922 presented an entirely new set of conditions. In July and August charges for freight locomotive repairs were extremely low due to the fact that the shops were not at work. Traffic movement from April, 1922, on was impeded by the coal strike which began on April 1. The volume of traffic was further reduced by the shopmen's strike, the combined effect of the two strikes being readily evident from the trend of the curve showing gross ton-miles. From August on was a period of expansion in traffic. As a result of the renewal of activity in the shops and roundhouses it was also one of expanded locomotive repair costs. The curve of costs still trailed the curve of traffic but in this case the reason was the difficulty presented in bringing the shop forces back to a pre-strike normal. The curve of locomotive repairs per 1,000 gross ton-miles declined even more markedly. The figure for November, $0.278, compared with a figure for February of $0.374. It is of special significance that the year 1923 was different from the years preceding in that costs per 1,000 gross ton-miles decreased rather than increased with increased traffic volume.

The picture is amplified by the inclusion of the curve of locomotives in serviceable condition. The decline following the strike resulted in a low point in September, 1922. From then on it rose steadily continuing the rise through the period of decreasing unit repair costs until in October, 1923, the railroads had more locomotives in serviceable condition than at any time in the four-year period here analyzed.

It is not difficult to explain the increasing total and unit freight locomotive repair costs of the fall of 1922 as due to the difficulties contingent upon the work of reorganization of the shop forces. It was a time of expensive operation and

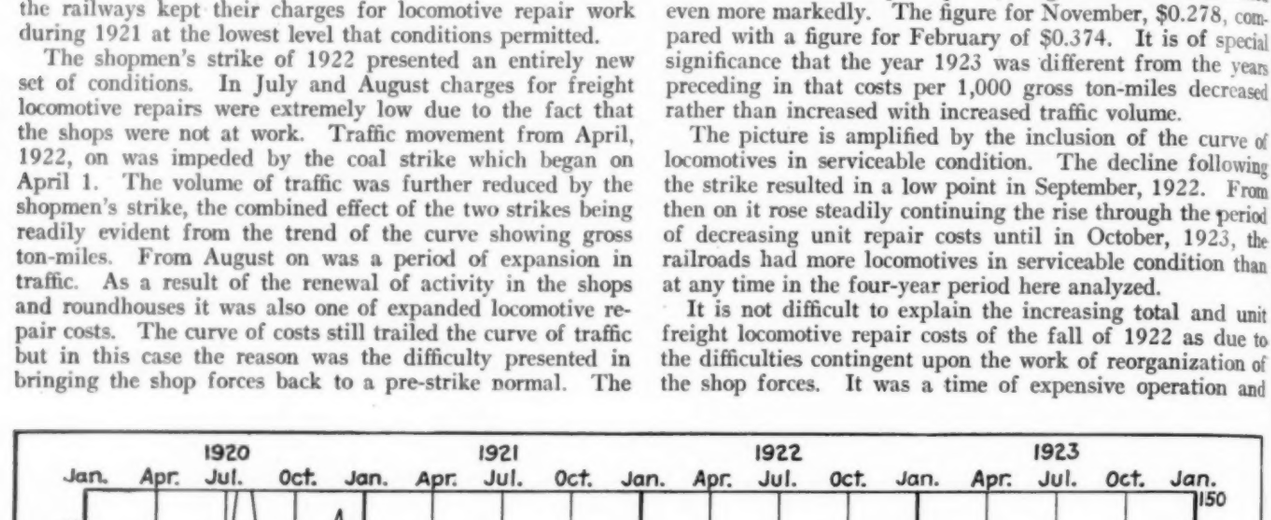

1920
1921
1922
1923
Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan. Apr. Jul. Oct. Jan.
Per Cent
Millions of Dollars
RATIO OF MAINTENANCE OF EQUIPMENT EXPENSES TO TOTAL OPERATING EXPENSES
RATIO OF MAINTENANCE OF EQUIPMENT EXPENSES TO TOTAL OPERATING REVENUES
TOTAL MAINTENANCE OF EQUIPMENT EXPENSES

Fig. 4—Maintenance of Equipment Ratios

increase in total locomotive repair costs continued progressively through the remainder of 1922 and into 1923. It did not fall with the drop in traffic at the end of the year and culminated in March, 1923, with a dip for the single month of February when severe weather caused a marked falling off in traffic. Practically the same tendency was shown in the cost of locomotive repairs per 1,000 gross ton-miles, the peak in this case being reached in February.

The Real Story

It is from April, 1923, on that our real story is to be found. The volume of traffic remained at about the March level until June, following which it began to increase until its culmination in October with the largest volume of gross ton-miles reported for any month in the four years. The total cost of freight locomotive repairs, however, showed a tendency to decline. It was lower during the peak traffic month of October than in January, March, June or August. There was a marked decline shown for November. The arduous labor for the operating and mechanical department managements. The gradual decline in total locomotive repair costs and the sharp decline in unit costs following the first two or three months of 1923, if it represented anything, represented the restoration of efficiency. For evidence we revert again to Fig. 1, the chart showing the repaired locomotives turned out of shop. The total for every month from May, 1923, on was greater than the total for January for which the highest output was reported up to that time. The significant feature is that this increased output was secured with a gradually decreasing cost of locomotive repairs in total or on the basis of the unit of 1,000 gross ton-miles.

The point may be made that locomotive repair costs in 1923 were abnormal. The evidence seems conclusive that in these costs there was no representation of inefficiency. Everything points to the opposite, namely to an increase in efficiency of a marked degree. This is, of course, the experience of mechanical department officers whose views will bear out what is here shown statistically.

The efficiency and economy of railway operation in 1923 has generally been held to be shown in the fact that the year's record-breaking traffic was handled without car shortage or congestion. Other factors sometimes mentioned prominently are the high figure of car miles per day and, of course, the increase in net income and the decrease in the transportation and operating ratios. There is also much valuable data to be obtained from the figures of unit cost. The unit cost figures include a large proportion of wages. There were wage increases effective August 1, 1920, with retroactive payments which some roads charged in August and others spread throughout the later months of 1920. In 1921 there was a decrease in wages of approximately 12 per cent effective July 1 and in 1922 mechanical forces were cut a further 10 per cent, which cut was the cause of the strike on its effective date July 1.

Cost Per 1,000 Gross Ton-Miles

Mention has already been made of the method followed in working out the unit cost figure. The total unit cost per 1,000 gross ton-miles in 1920 was very high; it averaged for the year $1.424. In 1921 it averaged $1.253; in 1922 the figure was $1,184, and for the year of 1923 it averaged but $1,137. The item of locomotive repairs did not show a like trend of decrease. The figures follow: 1920, $0.358; 1921, $0.314; 1922, $0.290, and 1923, $0.318. However, the figures for 1923 show a trend as follows:

Cost per 1,000 Gross Ton-Miles

Month	Locomotive repairs	Other selected accounts	Total selected accounts
January	$0.352	$0.959	$1.311
February	.374	1.009	1.383
March	.347	.915	1.262
April	.329	.834	1.163
May	.320	.785	1.105
June	.331	.771	1.102
July	.312	.762	1.074
August	.313	.758	1.071
September	.289	.757	1.046
October	.287	.772	1.059
November	.278	.783	1.061
December	.289	.811	1.100

The figures in the early months of the year reflected the aftermath of the shop strike, particularly as concerns the item of locomotive repairs. The decrease in costs throughout the remainder of the year reflects the increasing efficiency with which operations during 1923 have been credited. In view of the sustained large amount of locomotive repair work accomplished throughout the year the decrease in cost of locomotive repairs per 1,000 gross ton-miles must strike one as valuable testimony to the effect that the mechanical department operations have been characterized by increased efficiency. The figures, taken by and large, reflect as good an average of increase in efficiency as is evidenced in the selected accounts dealing with transportation factors.

Fig. 3 will be found of interest. It represents an attempt to determine the relationship of locomotive repairs to total maintenance of equipment expenses. Two ratios are plotted. One is the ratio of total freight locomotive repairs to the total maintenance of equipment expenses. The other is the ratio of the combined total freight and passenger locomotive repairs to total maintenance. The chart evidences again the cessation of locomotive repair work in July and August, 1922, and the importance paid to the remedying the locomotive repair situation following these months. The chart in general shows the same factors evidenced in Fig. 2. It gives interesting indication of the special effort directed towards passenger locomotive repairs in August, 1922, as evidenced by the much sharper rise in the upper than in the lower curve.

Freight Car Repair Statistics

Unfortunately we have no monthly figures of freight car repair costs. We do know that total maintenance of equipment costs showed a tendency to increase throughout 1923 up to October, but that locomotive repair costs tended to decrease and as the months went on also tended to constitute a smaller ratio of the total maintenance of equipment expenses. The presumption must be that freight car repairs have been receiving marked attention. Our figures of freight cars repaired go back only to June 1, 1923. However, we do know that in the first five months of 1923 there was relatively little change in the freight car repair situation. On January 1, 1923, there were 216,001 cars in bad order, or 9.5 per cent, and on June 1, 1923, 211,766 cars, or 9.4 per cent, a reduction of only 4,245 cars. At the end of the year, however, the number of cars in bad order had been reduced to 158,175, or 6.9 per cent. In other words the reduction in bad order cars which amounted to 68,000 during the year was practically all made in the second half of the year. It is unfortunate that the monthly figure of unit costs does not also include the item of freight car repairs. Much interesting information could be gleaned if we had that figure concerning the monthly trend of car repair costs or relating to mechanical department efficiency in the car department.

Maintenance Ratios

The use of the so-called maintenance ratios has been criticized in various quarters and correctly so. However, the ratios have a value if properly used, or in other words if proper regard is had for their limitations. In Fig. 4 there are plotted the ratio of maintenance equipment expenses to total operating revenues and total operating expenses by months from January, 1920, to December, 1923. The chart shows for the four-year period a selection of the information which was shown on the three charts used in the article, "Equipment Maintenance Out of Proportion," in the *Railway Age* of December 22, 1923, supplemented by later data. The actual maintenance of equipment expenses is plotted in Fig. 4 for purpose of comparison with the trend in the ratios. The ratio of maintenance of equipment expenses to total operating expenses is shown to be higher in 1923 than in any previous year, whereas the ratio to total operating revenues is shown to be less. Throughout 1923 taken by itself there was little change in the ratio, which means, of course, that the amount of total maintenance of equipment expenses varied month by month in harmony with the changes in total operating revenues or total operating expenses.

What we should like to know is whether the ratios will continue to remain the same for the present year. There is room for believing that the maintenance of equipment ratios will decrease. The railroads have now caught up on their locomotive repair work as is instanced by the marked reduction in unserviceable locomotives during recent months. Further than that the repair work is now being carried on with gradually increasing efficiency from that which ruled early in the year when a large portion of the roads were still fighting the shop strike. With less work to do and with lessened costs applying, does it not seem reasonable to believe that a marked reduction in total locomotive repair costs is in order? Marked progress has been made in freight car repairs. It appears that the freight car repair situation is also such as to lead one to believe that decreasing costs for freight car repair work may likewise be expected. Does it not therefore follow that coming months should show decreasing maintenance of equipment costs and therefore a decrease in the maintenance of equipment ratios? How marked the decreases may be is a question. The point, however, can be made that the railways are now favored with an unusually good equipment condition. Their problem of catching up on the strike and upon the deferred maintenance of 1921 and early 1922 is definitely behind them. The solution of that problem was the reason that maintenance of equipment expenses in 1923 were so high. It follows that maintenance expenses in 1924 should once more be restored to a normal level and to a normal relationship with previous years.

Attorney General Reports to Congress on Shop Strike

WASHINGTON, D. C.

FULL COPIES of all telegraphic and other correspondence between the Department of Justice and others relating to the strike of railway shop employees which began on July 1, 1922, have been transmitted to Congress by Attorney General Daugherty in the form of an appendix to his annual report, in response to a concurrent resolution passed by Congress on March 3, 1923. The report, which gives a comprehensive and detailed history of the strike, was made public on March 8 and occupies 690 printed pages, including thousands of letters and telegrams exchanged by the late President Harding, the attorney general, other department of justice officials, United States marshals, federal agents, railway executives and labor leaders.

Together with the report were submitted printed copies of other documents which the attorney general said constitute practically a complete record of the injunction case instituted by the government before the United States district court for the northern district of Illinois. "The strength and effectiveness of the several injunction decrees," Mr. Daugherty said, "are a complete vindication of the use by the government of the civil processes of its courts to quell lawless disorders and to compel obedience to its laws."

From the digest of the evidence in this case approximate summaries have been compiled, as follows:

(1) The testimony of 724 witnesses has been introduced in evidence in a record consisting of 3,968 pages.

(2) Witnesses were examined from 50 railroads, all of which are engaged in interstate commerce and in the carriage of United States mail, operating over an aggregate mileage of 190,242 miles.

(3) The total cost of the shopmen's strike of July 1, 1922, on the 50 railroads from which testimony was adduced amounted to $96,501,376. This is only cost paid out and does not include damages to property, loss of business incurred, increased cost of doing business, nor loss by claims for damages.

(4) The total cost to the Department of Justice for additional United States deputies and expenses, as evidenced by certificate of Augustus T. Seymour, acting attorney general, amounted to $1,922,639.

(5) The 50 railroads from which proof was taken had in their employ on July 1, 1922, prior to the strike order becoming effective, approximately 276,989 shopmen, of which number 90 to 98 per cent responded to the strike call.

(6) The general effect of the strike on the performance and operations of the 50 railroads from which testimony was adduced was to increase delays of freight, passenger, and mail service approximately 50 per cent.

(7) The general effect of the strike on the motive power of the 50 railroads from which testimony was adduced was to bring about a general breakdown and deterioration of motive power, resulting in the consumption of such surplus motive power as these roads had on July 1, 1922, and in the inability on the part of most of these roads to perform any back shop repairs during the early months of the strike and limited repairs from then on.

(8) The general effect of the strike on the business and industry of the country, as evidenced by the testimony of 53 representatives of leading business concerns of the country, was a general disturbance, slowing down of production, reduction of volume, loss of customers, and monetary losses due to delays on the part of business houses in receiving and obtaining raw materials and in shipping and transporting finished products.

(9) The effect of the strike on the United States Postal Department as evidenced by certificate of Harry S. New, postmaster general of the United States, was the discontinuance of 705 trains carrying United States mail, operating over a total of 39,716 miles, and the consequence of which was that 462 United States post offices—serving a population of 352,671 people—were without mail service.

(10) That on account of the belligerent, violent, and lawless conduct and demeanor of strikers and pickets the 50 railroads from which proof has been taken employed during the period of the strike a maximum at one time of 53,831 additional guards and police officers for the protection of their respective properties and employees, and that as additional police protection United States marshals, militia, and state constabularies were required.

(11) That practically all of the terminals, shops, and roundhouses of the 50 railroads from which proof was taken were picketed; that the conduct and general demeanor of the pickets and strikers was aggressive, belligerent, violent, and lawless; that in order to keep men in the employ of these roads during the strike it was necessary at practically all points to construct bunk houses and commissaries and to house and feed the new employees on company properties, and that the 50 railroads from which proof has been taken housed and fed all employees on company property at 1,055 points scattered throughout the United States.

(12) That the record in this case establishes damage to property and persons as follows:

(*a*) Approximately 19 deaths, due to violence and assault by strikers.

(*b*) Approximately 1,500 instances of various kinds of assaults by strikers on employees of and those seeking employment with the respective railroad companies.

(*c*) Approximately 65 cases of kidnapping, with accompanying brutal assaults.

(*d*) Approximately 8 cases of tarring and feathering of new employees by strikers.

(*e*) Approximately 50 cases of burning and dynamiting or attempting to burn and dynamite bridges over which trains engaged in interstate commerce and carriage of United States mail passed.

(*f*) Approximately 250 cases of burning or dynamiting, or attempting to burn or dynamite property of the railroads and homes and property of the employees.

(*g*) Approximately 50 cases of derailments or attempts to derail or wreck trains engaged in interstate commerce by greasing tracks, placing obstructions on tracks, removing spikes, interference with frogs and switches, cutting wires, signal apparatus, etc.

(*h*) The cutting of air hose, throwing of stones, firing of shots, placing foreign substances, such as blue vitriol gaskets, soap, and slugs, in pipes, cylinders, and other parts of locomotives, tampering with electrical equipment, removal of cotter pins and other necessary parts of locomotives, placing of emery, sand, and other foreign substances in journal boxes, occurred so generally and frequently throughout the country on all railroads from which proof was taken as to preclude compiling number of such cases.

(13) Independent of the facts shown in the foregoing summary of the evidence adduced, the stipulation, made and set out in XI hereof, and the extracts from bulletins therein set out, show the extent up to the time of the issuance of said bulletins, respectively, of the strike, the paralysis of the railroads, and of the business of the country, and the same are herein referred to for the facts so admitted.

(14) That in May, 1923, as per testimony of John W. Higgins, executive secretary of the Western Association of Railroads, the strike was formally on and pending against 62 per cent of all of the railroads in the United States engaged in interstate commerce, representing a mileage of 140,316 miles.

How to Start Personnel Work on a Railroad

Brief Outline of Various Steps Which Must Be Taken to Develop a More Efficient Organization

By J. C. Clark

THE EFFICIENCY with which human labor is applied to transportation service is the controlling factor in successful railroad operation. This statement is made with full appreciation of the vast improvement in equipment and facilities during the past 25 years. In an editorial in the *Railway Age* of September 9, 1922, this statement was made: "The effect of the very best facilities and equipment can be completely nullified unless the men who operate them understand clearly just what is expected of them and are interested in their work and encouraged to put forth their best efforts." This statement is true. It is impossible to secure the full benefit of investment in modern equipment and facilities unless employees are thoroughly trained in their use and know the maximum results that are expected of them.

The big question is how to obtain efficiency in the human organization. Perhaps the first thing to consider is the general plan or organization. R. N. Begien, now vice-president of the Chesapeake & Ohio, gave an address before the American Railway Bridge and Building Association in October, 1922, in which he pointed out very clearly the necessity for the careful survey of railroad organizations. Every officer should clearly understand for what duties and results he is held responsible. The executive officer should assign each member of his staff to definite duties and definite territories wherever possible. Mr. Begien also pointed out that in an organization of 100,000 men only five steps are necessary from the laborer to the president of the railroad.

It is obvious to anyone familiar with large organizations that someone must be responsible for every detail of the work, and it is almost equally important that no two departments overlap and thus create a condition of joint responsibility. A condition of this kind leads at once to the well-known American game of "passing the buck." This question of proper organization is important, because no one can give the most efficient service unless the organization is right.

Find the Trouble

In applying a new method to large organizations there is a vast amount of inertia and precedent to overcome. The co-operation of officers and employees must be secured and this cannot be done all at once. The logical thing to do is to pick out the group where the need seems to be the greatest and concentrate on that group.

The best means of locating the weak spots is through a well developed system of labor turnover reports (see "Labor Turnover Not a Disease, but a Symptom," *Railway Age,* December 31, 1920). When labor turnover is studied it will be found a pretty sure indicator of trouble. In other words, it will show where inefficiency and friction exists, but will not show why it exists; that is its true function—not to show what the trouble is, but where it is. It will require special investigation to diagnose the difficulty and apply the proper remedy. In this connection it should be stated that adequate and accurate labor turnover data cannot be determined without excessive cost unless the personal record system has been devised and built up in such a way that statistical information can be secured quickly and cheaply (see "The Importance of Personal Records," *Railway Age,* December 1, 1923).

Employment Service

When labor turnover reports have been established for a sufficient length of time to permit comparisons to be made, a rather definite course will be indicated with regard to employment (see "The Functions of Railroad Employment Service," *Railway Age,* February 4, 1921). The labor turnover reports will show the stability, or rather the unstable condition of employment in the various departments and divisions. A properly co-ordinated employment service will be able to correct this condition to a certain extent and will also be able to choose a better class of employees for some branches of service than is possible with the methods now being used on most railroads; and right here is where the development of personal efficiency begins. The railroads provide the service most vital to the prosperity of the country, and railroad employees that come in contact with the public largely determine the attitude of the public towards the railroads. Naturally the very highest type of citizen is necessary if the most successful operation is to be the result.

Training of Employees

A properly organized employment service can without doubt provide the best human material available in the shape of new employees, but the new employee must be properly trained in the service and this again requires special consideration. As in all other occupations, some men will be found capable of developing higher efficiency than others, some will need special training and supervision, while others will train themselves and their ambition will make supervision practically unnecessary. It is, therefore, necessary to provide some method of concentrating special attention on the individual employee who is not up to the average. Such a method has been devised and has been largely used in some of the industries and has also been experimented with on some railroads with good results (see "Training and Developing the Railroad Worker," *Railway Age,* March 18, 1921). This method is based on psychological principles and is as free from personal prejudice as it is possible to make human estimates of human capabilities; it is this feature that gives it great value.

No two men will think the same towards a third man, but by selecting a limited number of qualifications necessary in the individual employee and securing the opinion of as many officers as possible, based on the qualifications selected, a percentage rating can be obtained that will indicate the individual's true service value insofar as exact values can be obtained in human capabilities. This method will at once indicate those individuals who are below the average in efficiency, and these individuals can then be induced to take special training, possibly in the way of correspondence courses or in courses of study outlined by the company itself, in order to bring their service up to the standard required. This method will also at once raise the question of the men best fitted for promotion and this in turn leads to a discussion of the best methods of providing training for foremen and all supervisory officers.

A foreman is very often appointed because he is an exceptionally good workman and then fails entirely in his new position because he does not understand handling men. A supervisory officer must know his work, but it is of much

more importance that he have the ability to lead and handle men. Some men seem naturally born for leadership and, if a man who has this qualification is available, he should be given special training to see that he has a wide viewpoint of railroad operation and understands the relationship between his own particular work and the entire transportation machine. A considerable number of institutions have devised courses of study that will help, but, unless the railroad company gives its hearty co-operation and support, from the highest executive officer down, the results are likely to be disappointing. It is important, therefore, that well developed courses of study should be provided, not only for the supervising officers, but for any employee who has the ambition and ability to fit himself for more responsibility.

Analyzing the Job

No man can perform his best service on a job where the co-ordination of jobs has not been properly worked out and it is, therefore, necessary to analyze each job very carefully (see "Job Analysis and Job Specification," *Railway Age*, September 3, 1921). As indicated in the article referred to, job analysis will determine the best methods of carrying on the work under existing conditions, and it is obviously necessary to develop the best methods in order to secure the highest efficiency.

In analyzing the various jobs a description or specification of each job should be developed. This specification will be very necessary for the employment service. A job can often be best described by outlining the qualifications necessary in the man who is to fill it; and it should be the function of the employment service to secure men who fit the description. It should be the function of the men having charge of training to develop men with the qualifications necessary to fill the jobs of the highest responsibility and importance; they will have to be guided to a certain extent by the job analysis.

Summary

In order to make a clear picture, let us summarize briefly:

First, make a brief survey of the organization to see that there is no overlapping of authority and that someone is directly responsible for every detail of operation.

Second, make a survey of personal records to see that each employee's record is complete and kept up-to-date, and also that the personal record system is such that accurate statistical data can be secured with little expense.

Third, inaugurate monthly labor turnover reports and make a thorough study of the information thus made available.

Fourth, make a careful survey of employment methods and, if necessary, organize a new employment service with the object of securing the best men available and co-ordinating the employment of men in the various departments and divisions.

Fifth, inaugurate a method of determining a man's value to the service, which can be done with considerable accuracy and without prejudice by the use of the method of limited impressions.

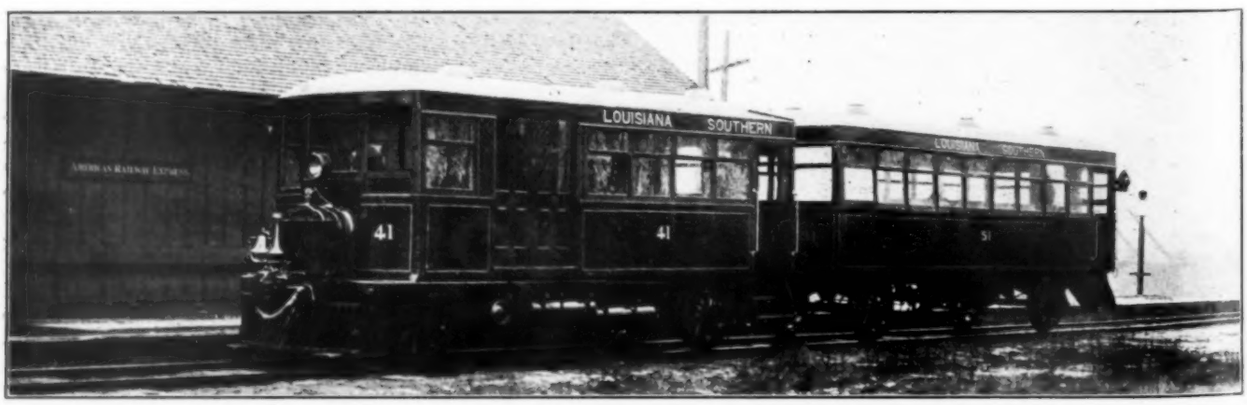
Sixth, develop systematic methods of training the individual, always bearing in mind that if training is left to individual initiative it will not be uniform and will not produce the best results.

Seventh, analyze each job with the idea of standardizing operation, defining responsibilities, working out the sequence of jobs and securing data for job specification.

Personnel Records Fundamental

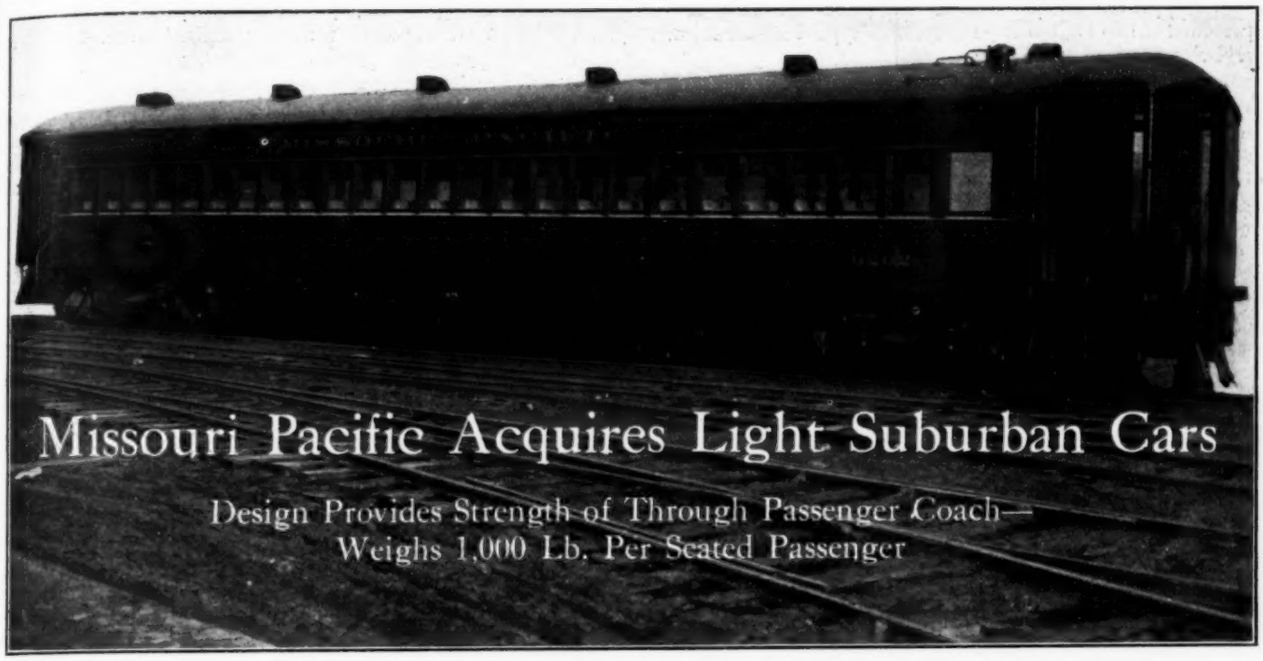
It will be understood that the foregoing summary is only intended to give the order in which the various problems should be taken up and that when the first and second phases of the work have been completed, work may begin on the other phases in the order shown. For example, a study of labor turnover will involve the problem of determining the cost of labor turnover, which is in reality the cost of employing and training men. In order to secure full information on this question the careful study of each job is necessary, but this leads at once into job analysis, which is the seventh phase of the work mentioned; therefore, in actual practice complete figures on the cost of labor turnover will probably not be worked out until the work of job analysis is completed. It should also be observed that all of the activities mentioned are based on personal records. Without a personal record system adapted to keep the complete record of every employee in such a way that his individual progress is shown, there is no way to determine the progress of the work as a whole.

The object of this article has been to indicate a definite program for initiating personnel work on a railroad. It will be understood, of course, that a bare outline only can be given in an article of this kind, and the possibilities of development are so many that only a very few of the main features have been mentioned; but it is hoped that even this may be of some value to those who have been studying this great problem. It is only by thorough discussion and constructive criticism that these problems can be worked out and any step that will help to develop this discussion and criticism should be of value.



Louisiana Southern Two-Car Motor Driven Train Built by the Four-Wheel Drive Auto Company

This train operates between New Orleans and Shell Beach, a distance of 40 miles. The first car has a compartment for the motorman and baggage fitted with auxiliary seats for 11 passengers and a smoking or negro section seating 16 passengers. The trailer has seats for 40 people. The power plant is a four-cylinder gasoline engine of 42 hp., S. A. E. rating and 68 hp. on brake test.

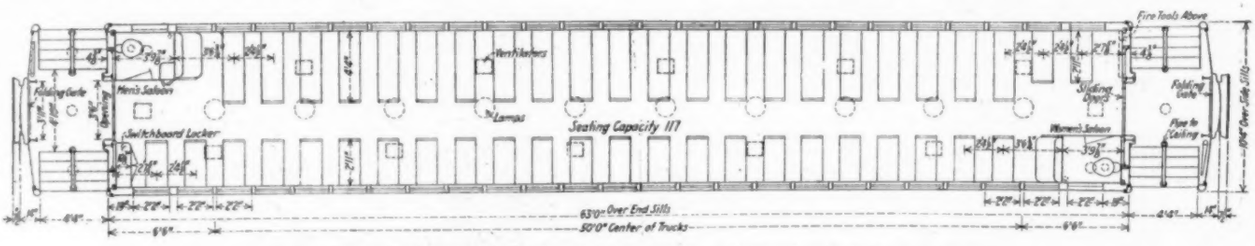


Missouri Pacific Acquires Light Suburban Cars

Design Provides Strength of Through Passenger Coach—Weighs 1,000 Lb. Per Seated Passenger

THE MISSOURI PACIFIC has recently received 13 new suburban coaches and four combination suburban passenger and baggage cars from the American Car & Foundry Company. This equipment is intended for service between St. Louis and outlying suburban points.

The suburbs in the St. Louis district are only a few miles from the heart of the city, and it was decided that the utmost seating capacity with convenient facilities for promptly loading and unloading were demanded by the conditions. The seats, which are of the Walkover type, manufactured by the American Car & Foundry Company, are divided so that the long crossover seat holds three passengers and the short crossover seat has ample room for two passengers. The longer seats are 4 ft. 4 in. in length and the shorter ones 2 ft. 11 in. in length. The aisle, therefore, is off the center of the car. It affords ample space for passengers to move two abreast without undue interference. The seats have no arms, which adds considerable to the ease of passage through the aisle and of entrance into the seats.



Floor Plan of Missouri Pacific Suburban Coach Seating 117 Passengers

Cars Equal Through Passenger Coaches in Strength

The cars are of steel construction throughout, with steel interior finish, except for Agasote headlining and wainscoting. The underframe and superstructure details have been so designed that their strength is equal to that of coaches in through passenger service.

The center sills consist of two 12-in., 35-lb. channels, having top and bottom covers of ⅜ in. open hearth steel plates riveted to the flanges. Cast steel double body bolsters and platforms make up the two ends of the underframe construction. The side sills are 6-in. by 6-in. by ½-in. rolled steel angles, extending in one piece from end sill to end sill. The side and center sills are tied together with two deep crossbearers, consisting of 5/16-in. pressings placed back to back and provided with top and bottom cover plates of 10-in. by ½-in. open hearth steel.

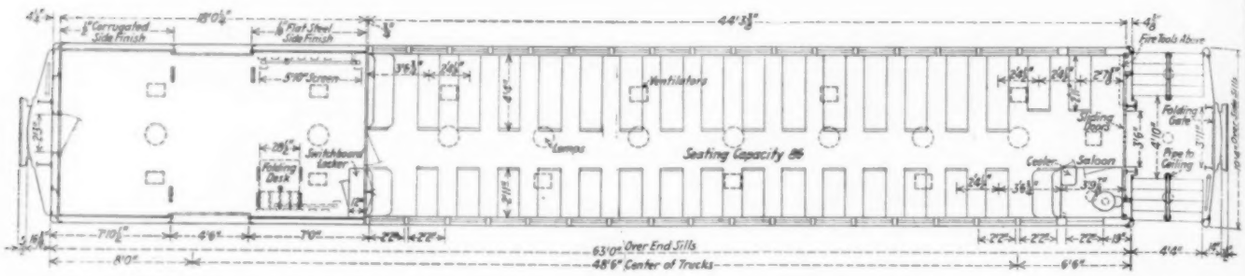
The floor supports, spaced approximately 2 ft. 4½ in. apart, form additional underframe members and consist of 3/16-in. pressed steel diaphragms. The side girder construction is made up of 3/16-in. rolled steel plates; it has for its lower chord a side sill angle of 6-in. by 6-in. by ½-in. section and utilizes as its upper chord the belt rail member, composed of a 4-in. by ½-in. steel plate applied the full length of the car. On the inside of the side girder web are placed 2-in. by 2-in. by ¼-in. angles, which form an additional member of the top chord. The side posts are ⅛-in. channel-shape pressings, offset for the side sill and the side plate.

Turtle-Back Roof Applied

The roof is of the turtle-back type. It has side plates of 4-in. by 8.2-lb. Z-bars supporting open hearth steel angle carlines of 3½-in. by 2½-in. by ½-in. section. Two purlines, consisting of 2½-in. by 2-in. by 3/16-in. open hearth steel angles, are used in this roof construction. The roof is of poplar 13/16 in. thick by 3¼ in. face width, covered with canvas. Between the canvas and the wood roof is placed a felt roofing paper and as a preservative, the underside of the canvas is given a coat of paint. The canvas is secured with copper tacks and the outside has three coats

of an approved outside canvas roof preserver. The roof is provided with 12 Utility honeycomb type ventilators, with registers on the interior.

Double windows are used in these cars with each outside sash fitted with O. M. Edwards window fixtures. Rex weather stripping is applied to four sides of the outside sash. A sash raised sufficient to secure a distance of 46 in. from the floor line to the bottom of the sash enables seated



Floor Plan of Combination Car; Seats are Provided for 86 Passengers and Approximately 180 sq. ft. of Space for Baggage

passengers to have an unobstructed field of vision. Seats are spaced so that each passenger is opposite a window, giving opportunity for ample light during the day.

The cars are well insulated, having one course of 1-in. hair-felt and one course of 3-ply Salamander under the entire floor area. On the sides and ends against the outside sheets is placed one course of 3-ply Salamander, which is applied after the inside of the steel has received a coat of paint.

Careful Attention to Lighting Arrangement

To facilitate reading, the lighting arrangement for these cars has been carefully planned. Along the center of the low-arched ceiling are placed 10 attractive center lamps. The head-lining is finished in a cream color down to the frieze molding. This combination of a low-arched, light colored ceiling diffuses the light so that passengers can read comfortably. The extra wide platforms require well distributed light, and three vestibule lights are used on each platform. Current for the lamps is furnished by a 3-kw., 40-volt, 75 ampere generator, and each car is provided with an Edison 24-cell storage battery.

The latest system of vapor and pressure steam heat is used in the cars, designed to maintain at all times a comfortable temperature on the interior. Each car is provided with a Giessel sanitary water cooler of 11 gal. capacity. The water supply for the cars is taken care of by an overhead copper tank located at each saloon. The cars are equipped with the Westinghouse Schedule UC-1-1612 air brake equipment and the American Brake Company's slack adjuster.

Four-wheel trucks are used, with the Commonwealth Steel Company's frames, equipped with Simplex clasp brakes. The wheel base is 8 ft. long and the wheels are of cast steel, 36 in. in diameter. The journals are 5½ in. by 10. in.

Ample Room Provided for Entrance and Exit

The floor plan arrangement shows that each car is equipped with two saloons, fitted with flushing hoppers. It will be noticed that the end doors have an opening of 3 ft. 6 in. and that considerable room has been provided immediately inside of the doors. This feature tends to avoid congestion when passengers are getting on and off the cars.

The platforms are exceptionally wide, having an opening of 4 ft. 4 in. at the vestibule steps. A standing space of 25 sq. ft. is available. At the center of these steps a pipe railing is provided, which will allow of a continuous stream of passengers entering and discharging from the cars. In other words, the arrangement has been so worked out that persons getting off the car will not interfere with those entering the car. The vestibule steps have four treads and are easy to reach from platforms at track level.

It will be noted that this equipment and its appointments correspond with the highest grade of coaches used on through passenger trains. The interior presents an exceptionally neat appearance, and the low-arched roof gives the effect of spaciousness throughout the car. The interior is finished in mahogany color, and statuary bronze trimmings are used throughout. The exterior presents a smooth, uniform appearance, an effect which is secured by the wide letterboard and uniform window spacing.

All the doors in these cars are of steel construction. The end doors are double, of the sliding type, with stationary glass in each door. They are so arranged that each one may be operated independently.

End View of the Car, Showing the Wide, Individually Operated End Doors

The empty weight of these cars is 118,000 lb. With a seating capacity of 117 persons the weight per seated passenger is slightly over 1,000 lb. A modern steel coach for through train service weighs approximately 135,000 lb., and figuring a seating capacity of 88, the weight per seated passenger is approximately 1,500 lb. This car, therefore, is approximately 500 lb. less in weight per seated passenger than the ordinary coach.

The over all length of the cars coupled is 74 ft. 9 in.; the height from the rail to the top of the roof at the center is 13 ft. 6⅛ in.; the height from the rail to the side of the

The Seats Accommodate Three Passengers on One Side and Two on the Other; Ample Light Is Provided for Reading

eave molding is 11 ft. 2 5/16 in.; and the height from the rail to the bottom of the side sill is 3 ft. 7 11/16 in.

These cars were built at the St. Charles, Mo., plant of the American Car & Foundry Company.

An Aid to Economical Operation

By George G. Yeomans

THE PROPOSAL to set up a new primary account, "Purchasing & Stores," in the classification of operating expenses, is one of the most progressive steps that has been taken for many years in the interest of economical railway management. That the necessity for it has not been sooner apparent is due to the fact that no questions of a purely technical or operating nature are involved. There are no engineering or mechanical problems to be solved in managing the investment in material and hence, it has not attracted the attention of the technical staff, and executives have failed to recognize its full importance because no provision has ever been made in the operating accounts for presenting plainly the essential facts. It has been treated as a matter of little moment, and yet it absorbs more than one-third of the entire gross earnings. There are not a dozen railroad managers in the country who know how much it is costing to handle their material, because a large percentage of the amount is being distributed direct to the various accounts into which the material itself enters. Not knowing what this total expense is, or just how it originates, it is impossible for them to supervise or control it intelligently.

The future welfare of the railroads depends almost wholly on the economies which they may be able to institute in their operations. No stone has been left unturned in the search for greater economy in the mechanical, engineering and transportation branches, but there remains a wide field in the commercial branch which has only been partially explored, and the principal reason for this is because it has never made its appearance in the operating accounts in a manner to attract the attention of executive officers. Material, as such, does not enter into the operating expenses until it is used, and the vast investment in unused material, aggregating more than $750,000,000 receives scant notice; it is dismissed with a single line in the general balance sheet.

The proposal, therefore, to set up a primary account, to which shall be charged the entire expense of procuring, storing and distributing material to the users, becomes a matter of the utmost importance. Looked at from a purely accounting standpoint it transcends the strict confines of operating expenses to some extent, but it has an enormous influence on them, and consequently, should rightfully appear in that connection; also, it is in that connection that it would attract the most attention. Obviously, the account would be of little value from the executive viewpoint unless it disclosed the entire cost of handling all material, and this necessarily includes some material that does not finally enter into operating expenses, but the handling costs of the different classes are so interwoven that accurate separation would be impossible, and any attempt would only involve additional expense; moreover, it is the total cost which should be subjected to scrutiny and regulation, if economical results are to be obtained. It is also evident that a bare statement of this total expense would be practically useless for supervisory purposes unless some means of measuring the work which it covers is provided and, therefore it would be important to state, as a footnote under this account, the total amount expended for material each month and the total value of the material used during the same period, as the costs cover both the purchasing and the handling of all the material that the company acquires. In this way the unit cost of the service could be readily determined for comparative purposes.

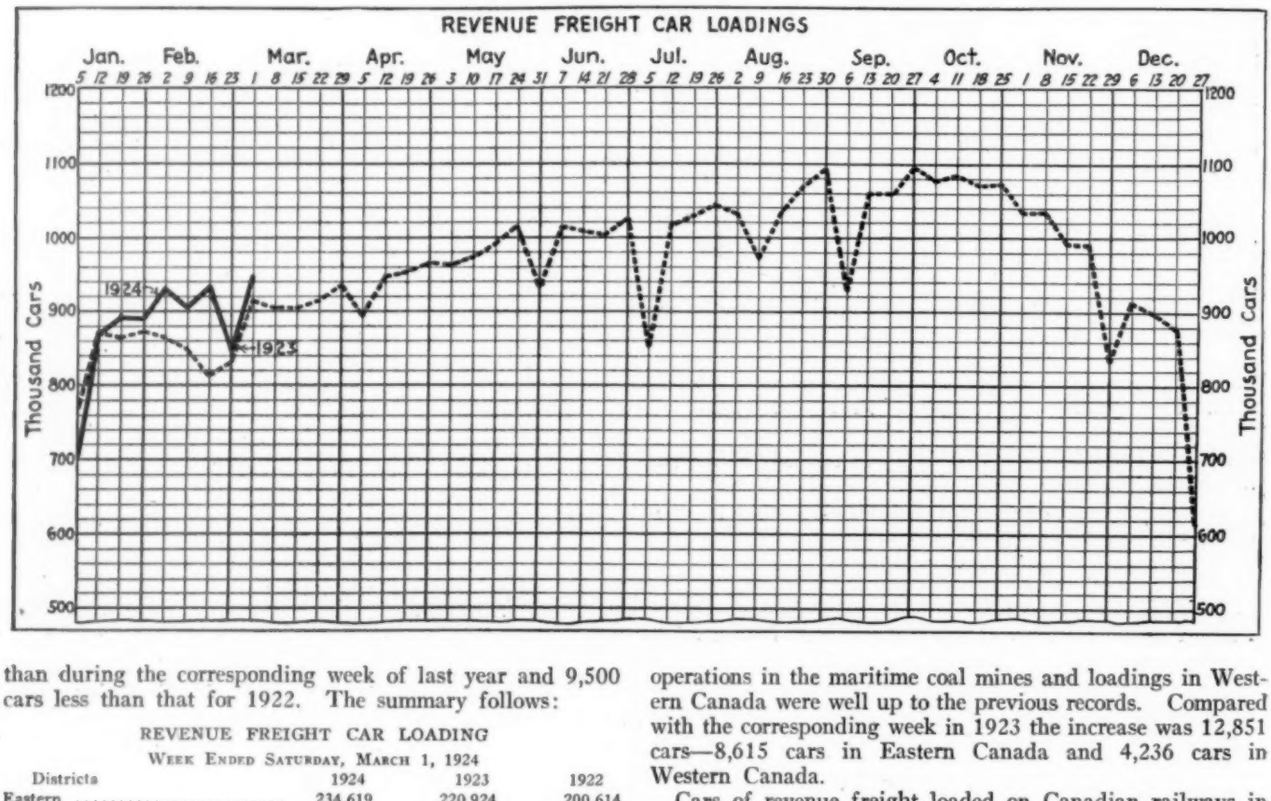
Strictly speaking, this is not a question of accounting any more than the handling of the material is an engineering or mechanical question; rather it is one of supervision and management, but there is no better place to present these figures than in the operating expenses, because of their great effect on them, and it is vitally important that they should be presented in concrete form if they are to serve as a guide to the largest economies that are possible today, in railroad management. The accountant whose vision is confined to the figures that flow from his pencil, will object that this proposed primary account will distort his comparisons with the figures of previous years and, to a certain extent, this is true; but when we consider that the cost of handling material is only a small percentage of its value, and further, that the value of the material is by no means the larger part of the total charges to any primary account, the distortion becomes so small as to be negligible compared to the benefit to be derived from an intelligent use of the information thus obtained.

The high state of efficiency to which railroad operation has been brought in this country is due, almost entirely, to the publication of accounts and statistics, prepared on a uniform basis, which has enabled railroad managers to measure their own performance by comparison with that of their neighbors. The reason why the management of the investment in material has not reached the same state of efficiency, and why the annual expenditure for material is 25 per cent greater than necessary on the average railroad, is because their managers have never had definite and accurate information on this subject. Anything that will serve to place in their hands a true conception of the situation in respect of the investment in unused material, and the costs involved in its proper care and distribution, will open the way to a marvelous reduction in the operating expenses. By all means, let us have this new primary account.

Freight Car Loading

WASHINGTON, D. C.

ANOTHER week of record freight loading is reported by the Car Service Division of the American Railway Association for the week ended March 1. The total was 945,049 cars, which exceeds that for the corresponding week of last year by 26,425 cars and that for the corresponding week of 1922 by 151,934 cars. Such a figure was not attained last year until April. In the Southern district, however, the loading was 5,000 cars less than that for last year, principally because of decreases in coal and forest products, and in the Central Western district there was a slight decrease. Increases as compared with last year were shown as to total loading of all classes of commodities except coal, coke and ore and the increase in l.c.l. merchandise was 17,284 cars. Coal loading was 7,078 cars less



than during the corresponding week of last year and 9,500 cars less than that for 1922. The summary follows:

REVENUE FREIGHT CAR LOADING

WEEK ENDED SATURDAY, MARCH 1, 1924

Districts	1924	1923	1922
Eastern	234,619	220,924	200,614
Allegheny	195,921	194,635	170,100
Pocahontas	45,950	36,382	36,762
Southern	142,852	147,884	121,803
Northwestern	126,583	124,634	97,040
Central Western	138,167	138,849	118,207
Southwestern	60,957	55,316	48,589
Total Western Districts	325,707	318,799	263,836
Commodities—			
Grain and grain products	51,377	44,969	49,082
Livestock	32,204	32,094	27,903
Coal	186,470	193,548	195,970
Coke	13,565	16,137	8,358
Forest products	81,021	75,962	47,003
Ore	9,853	10,520	4,718
Mdse L. C. L.	245,741	228,457	229,436
Miscellaneous	324,818	316,937	230,645
Total	945,049	918,624	793,115
Cumulative loading to date	7,924,617	7,654,188	6,606,120

The freight car surplus for the week ended February 22 averaged 125,117, including 51,772 box cars and 48,252 coal cars, while shortages amounting to 5,944 were also reported.

For the week ended February 29 the surplus averaged 134,273, including 51,398 box cars and 56,618 coal cars, while shortages amounting to 3,991 cars were also reported.

The railroads on February 15 had 11,783 locomotives in need of repair, 18.3 per cent of the ownership, according to reports to the Car Service Division. This was an increase of 992 over the number reported on February 1. Of the total number 6,304 or 9.8 per cent were in need of classified repairs, while locomotives in need of running repairs totaled 5,479 or 8.5 per cent. Serviceable locomotives on February 15 numbered 53,586, a decrease of 908 compared with the number on February 1, while serviceable locomotives in storage totaled 3,828, a decrease of 288 compared with February 1.

Car Loading in Canada

Car loadings at stations in Canada during the week ended March 1 aggregated 57,059 cars, showing a revival after the depression caused by the severe storms throughout Eastern Canada on February 19, 20 and 21. A portion of this increase was undoubtedly a carry-over from the previous week, but coal loading showed the effect of the resumption of operations in the maritime coal mines and loadings in Western Canada were well up to the previous records. Compared with the corresponding week in 1923 the increase was 12,851 cars—8,615 cars in Eastern Canada and 4,236 cars in Western Canada.

Cars of revenue freight loaded on Canadian railways in the week ended March 1, as compared with the previous week, are by commodities as follows, respectively:

	1924	
	Week ended March 1	Week ended Feb. 23
Grain and grain products	8,652	7,341
Live stock	2,562	1,714
Coal	5,404	3,664
Coke	275	301
Lumber	2,705	3,292
Pulp wood	4,525	4,411
Pulp and paper	2,272	2,389
Other forest products	3,852	3,365
Ore	1,002	869
Merchandise L. C. L.	13,373	10,631
Miscellaneous	12,437	8,953
Total cars loaded	57,059	46,930
Total cars from connections	37,943	33,550
Total for same week last year	44,208	44,510

SUGGESTIONS FOR INCREASED SAFETY made by employees of the Southern Pacific to the different safety committees during the year 1923 numbered 3,420; and of this number, 2,470 were approved by the committees and acted upon.

Alfred H. Smith Killed by Fall from Horse

New York Central Head Rose from Clerk and Laborer to Position of Leadership in Railway World

ALFRED H. SMITH, president of the New York Central and its affiliated lines, was killed on the afternoon of Saturday, March 8 last, as the result of being thrown from the horse on which he was riding in Central Park, New York City. Mr. Smith was an expert horseman and riding was one of his favorite recreations. He and his companion, Edward E. Hoopes, were proceeding at a canter and nearing the termination of their ride when a woman on horseback crossed the path of the two riders. Mr. Smith reined up suddenly to avoid a collision and was thrown striking on his head and shoulders in such a way that his neck was broken. He was hurried to a hospital and died without regaining consciousness. Mrs. Smith, who was in California at the time, was promptly advised. She was taken to New York on a special train in about 69 hours and in time for the funeral, which was held on Wednesday afternoon.

Alfred H. Smith

Mr. Smith would have been 61 years of age on April 26. He had been connected with the New York Central all of his business life and had served as the chief executive of the system since January 1, 1914, except for that period during government control when he was regional director of the Eastern region.

Mr. Smith began his railroad work as a messenger boy. The story of his career will form one of the romances of American business success, not only because of his rapid progress in the organization to which he devoted his life but also because of his many sided experience. He was at one time a clerk, at another a laborer, then general foreman of a construction gang, was suddenly made a superintendent, after which he moved up until he was at the head of the New York Central System.

Mr. Smith was born at Cleveland, Ohio, on April 26, 1863. He was the youngest of five children. He was in high-school intending to prepare himself for college when the death of his father necessitated the boy's leaving school and going to work. The boy was then 14 years of age. His first job was as a messenger boy in the purchasing agent's office of the Lake Shore & Michigan Southern at Cleveland. He later became a clerk, subsequently being placed in charge of stationery and serving in the office of the purchasing agent. After five years as a clerk he realized that opportunity in clerical work was limited and he sought employment in a construction gang at a dollar and a half a day. He was, after a while, placed in charge of a bridge gang and for some time prior to 1890 served as foreman of bridges on the Lake Shore & Michigan Southern. The young man must have shown most extraordinary capability, for in 1890 he was suddenly selected to be a division superintendent, a line of promotion which any railroad man will appreciate as being most unusual and such as could only be offered for merit of an extremely high order.

For one year, from October, 1890, to October, 1891, he served as superintendent of the Kalamazoo division, following which he held positions of the same rank as follows: February, 1893, superintendent, Lansing division; from then until July, 1897, superintendent, Franklin division at Youngstown, Ohio; and then, to 1901, superintendent of the Michigan division at Toledo. On April 1, 1901, he was promoted to assistant general superintendent of the Lake Shore with headquarters at Cleveland, which position he held only until June of the same year when he was advanced to general superintendent. In February, 1902, he was transferred to the New York Central & Hudson River with the title of general superintendent.

On July 1, 1903, he was promoted to general manager, which position he held until June, 1906, when he was elected vice-president. When the Lake Shore & Michigan Southern was merged with the New York Central & Hudson River in March, 1913, to form the present New York Central, Mr. Smith's authority was extended over both properties with the title of vice-president of the New York Central lines east and west of Buffalo. In March, 1913, he was made senior vice-president in charge of operating, maintenance and construction. Even this position, however, was not high enough to check the rapid progress of promotion for on January 1, 1914, he was elected president of all the companies in the New York Central System.

Mr. Smith's term as regional director for the United States Railroad Administration covered the period from January 18, 1918, to May 31, 1919; and on the latter date he returned to his place as head of the New York Central corporation. During the war he served also as a member of the Canadian Railways' War Board; and at the time of his death he was chairman of a board of trustees which, under the terms of the Tarafa bill, was working out the plans for the consolidation of the railways of Cuba.

The years of Mr. Smith's leadership of the New York Central were years of marked progress for the affiliated properties which progress was continued in fair degree during the adverse conditions of federal control and in marked degree

since. Mr. Smith, throughout this difficult period, stood forth at all times as a leader of real capability. It has been most recently, however, that realization has come of his skill as a railway executive. There have been few executives who have shown skill equal to that which he showed in meeting the new conditions of post-war railroad operation and governmental regulation. The New York Central will continue to carry on for some time various of the important projects to which Mr. Smith directed his attention. By this time the important work of equipment rehabilitation towards which special attention was directed after the return of the railroads to private control has been practically completed. The program continues of adding to New York Central motive power and cars, large orders having been placed during the present month. Among other important projects now under way are the construction of two new bridges across the Niagara River which will measurably improve the New York Central's position at the Niagara frontier; the construction of the Castleton cut-off and bridge across the Hudson river which will relieve congestion at Albany and effect marked economy in the movement of freight to and from New England over the Boston & Albany, important improvements in the way of grade revision and realinement on the Big Four and numerous other enterprises.

There remain many things which Mr. Smith did not bring to fruition but to which he had given special attention. Among them notably is the situation relative to consolidations and the part the New York Central has played therein, particularly with reference to its expressed desire to secure a portion of the Reading and the Central of New Jersey and to establish a new trunk line between Chicago and New York via Ashtabula, Ohio, Clearfield and Williamsport, Pa.

An issue remains of the terminal situation at the port of New York wherein the controversy between carriers and the Port Authority has happily been smoothed over by succeeding friendly relations and practical co-operation, much of which was due to Mr. Smith's personal activity. A plan for electrification and elimination of grade crossings on the freight trackage along the west side of Manhattan Island was prepared by the New York Central in petitions to the Transit Commission and and Public Service Commission last fall, the estimated cost of this improvement being given as $100,000,000. Mr. Smith had most ambitious plans for terminal expansion at Chicago as typified by his personal activity in securing a permissive order from the Interstate Commerce Commission for the acquisition of the Chicago Junction properties. These things are mentioned because they show the large number of developments in which the New York Central was and is involved. Mr. Smith played an important part in them all and it is a marked tribute to his ability and wide understanding that he was able to deal with so many matters of such great import to his system at one time.

Mr. Smith received marked recognition for his many abilities during his lifetime. It must have been a great satisfaction to him to read the earnings reports of the roads under his control and to see how uniformly good they were. His was the first road which was able to issue common stock for several years. New York Central stock is now on a 7 per cent basis and earnings are sufficiently promising to keep it there. Mr. Smith and his associates had plans for further consolidating of the system particularly the merging of the Michigan Central and the Big Four into the New York Central. Enough has been said, however, to indicate that Mr. Smith's successor, whoever he may be, will find enough to do if he merely seeks to carry on the policies worked out or planned by Mr. Smith.

Alfred H. Smith was one of the greatest railway executives of his day. In railway operating ability he had few if any equals combined with which he was unusually favored in the other attributes of executive success. He was a leader that the railway world can ill afford to lose.

It is not difficult to analyze the reasons for Mr. Smith's success. He was aggressive and forceful and his mind unusually direct. He knew railroading thoroughly and the New York Central System particularly and had clear comprehension of the destiny of that property and of the part that he was called upon to play in relation thereto.

He was particularly gifted in the matter of human relationships. Having come up through the ranks he knew men. He is recognized to have shown marked skill in the selection of those who worked with him and, having made his selections, to have shown willingness to allow his officers proper discretion and authority. He made much of his early friendships and never lost them as he rose to greater heights in the vast New York Central organization.

Much will be made, when opportunity is offered for appraisal of it, of Mr. Smith's adaptability. Hard work and skill in leadership and related natural ability paved the way for his rapid promotions. Adaptability in high degree must have been required, however, for the clerk to become a laborer, for the general foreman in construction work to become at once a successful superintendent and for the operating man to become the executive and succssful leader in all the activities of the New York Central System.

His many-sided skill received marked recognition. He was regional director during federal control. He was a member of the Canadian Railway War Board. More recently he was chosen to help work out the consolidation of the railways of Cuba. In each case he met conditions varying from those of the system with which he was thoroughly familiar. In each case he showed the same skill. He could not have done so if he had not, in addition to his other abilities, unusual power of understanding and adapting himself to conditions that were not familiar.

Mr. Smith was gifted with unusual foresight. He aspired at all times to keep the New York Central System among the leaders in railway progress. A standard example of his foresight was his placing for delivery many months ahead of large orders for locomotives in 1916 at a time when no present need was apparent but which locomotives were delivered for use in the peak traffic movement of 1918 with resulting great advantage to the property which he headed. More recent developments indicating the degree of the man's foresight are shown in a number of projects—the Castleton cut-off, the Niagara bridges, the activity in connection with consolidations and a number of things of like importance.

The characteristic of adaptability mentioned above was shown in the case of his own New York Central. The New York Central System is in many ways favored because of its location. It is not by chance, however, that the system has made such marked progress as it has since the railroads were returned to their owners after the period of federal control. The Transportation Act gave the railways entirely new conditions under which to work. The New York Central, under Mr. Smith's guidance, has shown marked success in meeting these new conditions and in solving the problems relating thereto.

It is now considered axiomatic that private ownership in this country will live or die according to whether or not private management can render adequate service. Mr. Smith had sufficient foresight to take the steps that would help the New York Central play its part in the situation. Shippers, passengers and official critics alike unite in commending present New York Central service in unqualified terms. The skill shown in putting and keeping the New York Central in the position to render service worthy of such commendation is in the last analysis probably Mr. Smith's greatest contribution to the walfare of the railways of this country at the present time.

Of Alfred H. Smith, the Wall Street Journal of Tuesday, said:

"By the shockingly sudden death of the greatest railroad

president of his time the entire country no less than the New York Central Railroad suffers a grievous loss. Alfred H. Smith began his life work of re-creating the Vanderbilt system long before he bore the title of its chief officer. No one understood better than he how much of unsparing subordination of self and of dedication of all personal talents to the common good such a task demanded.

"Mr. Smith was of the type of men who do the world's work happily free of any concern over the world's acknowledgments. Little of personal tradition or anecdote can be recorded of him because of the unusual directness and simplicity of his mind. If one should seek a single explanation of his career it would doubtless be found in that extraordinary decision to forsake the ease of a clerkship for the wearying labor of a section hand. The youth who so early in life had that much of judgment and will power could not have failed to rise far above the general run of men. He became the intimate of bankers, capitalists and many national figures without ever forgetting how he began—without even caring to forget.

"Though only 62 and in the prime of his physical and intellectual powers, Mr. Smith had accomplished a greater life work than many a man whose span of years is longer. Those who knew him grieve that he was not spared to enjoy the sunset years of realization and recognition of a life well used."

Railroad Matters in Congress

WASHINGTON, D. C.

THE HEARING before the Senate committee on interstate commerce on Senator Gooding's long and short haul clause bill was concluded on March 6 with the testimony of Alfred P. Thom, general counsel of the Association of Railway Executives. Mr. Thom said he would not discuss rate questions but that the important thing to consider is the principle involved and that the best interests of the country depend upon a flexible long and short haul clause. The question has been examined many times in the past 37 years and wherever it has been studied by an impartial tribunal it has universally been decided in one way. He pointed out that the low rates to the Pacific coast terminals were not created by the rail carriers and that if the bill were passed so as to prevent them from meeting those rates, the inevitable consequence of depriving the rail carriers of traffic must be faced. The effect of the bill would be to give the water lines practically monopoly while the rates of the railroads are regulated, he said:

A sub-committee of the Senate committee consisting of Senators Gooding, Howell and Mayfield held a hearing on March 11 on the bill S. 863 introduced by Senator Robinson, to prohibit the use of express and baggage cars except such as meet the requirements of the Interstate Commerce Commission as to construction, safety appliances, etc., J. J. Forrester, legislative agent of the Brotherhood of Railway and Steamship Clerks, Express and Freight Handlers and Station Employees, and other representatives of that organization, testified regarding the kind and condition of such cars being operated on some roads, many of which were described as being in an unsafe and unsanitary condition, without heat or toilet facilities and with inadequate safety and other appliances.

They said that many old mail cars had been rebuilt and that a number of old Arms Palace horse cars were being used under conditions which made them unfit for men to work in, particularly as the express messengers are not allowed to leave their cars during a run. Mr. Forrester asked that the bill H.R. 4107 introduced in the House by Representative Denison be substituted for the Senate bill. This provides that express, baggage and express-baggage cars, and all parts of such cars used in interstate commerce, shall be of such construction, style, length and character, and furnished in such manner, as shall be required by the commission; and that no such car shall be used which is not sound in material and construction and not equipped with safety appliance devices approved by the commission and with sanitary drinking water containers and toilet facilities, nor unless regularly and thoroughly cleaned. It is also provided that the commission shall not allow the use of such cars not constructed of steel or steel underframe or of equally indestructible material and that all such cars accepted for service or contracted for by carriers after January 1, 1926, shall be constructed of steel and the material used in the construction be of such strength, dimensions, weight and gage as the commission shall prescribe. The commission is also directed to investigate and act as the circumstances warrant upon complaint or information filed by any citizen supported by affidavit.

Bird M. Robinson, president of the American Short Line Railroad Association, asked that an opportunity be afforded for testimony on behalf of the short lines and electric lines. Senator Gooding said it had not been expected to devote much time to hearings on this bill but finally agreed that the witnesses might be heard on March 20. It is understood that testimony on behalf of the trunk lines will also be heard at the same time.

The Senate committee had previously reported, with an amendment in the nature of a substitute suggested by the Interstate Commerce Commission, a bill making it unlawful after 30 days for a common carrier to use a wooden car between or in front of steel or steel underframe cars in any passenger train. The commission, in a letter to the committee, urged immediate action on such legislation, saying it would not entail an additional expenditure, but would increase safety.

Senator Shortridge of California on March 5 introduced a bill, S. 2744, to confer jurisdiction on the Court of Claims to ascertain the cost to the Southern Pacific and the amounts expended by it from December 1, 1906, to November 30, 1907, in closing and controlling the break in the Colorado river, and to render judgment therefor. The bill recites that, at the request of President Roosevelt, and under the stress of great emergency, the railroad prevented the overflow and destruction of 1,214,000 acres of irrigable land in the Imperial Valley in Southern California, and saved to the government the Laguna dam and Yuma reclamation project connected therewith in Arizona, as well as thousands of acres of other government land along the Colorado river. The bill provides that the judgment shall be for the amount of the cost less such proportion of such expenditures and costs as would be fair and reasonable to be deducted as the company's share because of the amount and probable value of the land and improvements thereon belonging at the time to the company and which, in the opinion of the court, were saved by the closing and controlling of the break, as compared with the amount and probable value of the other property.

Both the Senate and the House commitees on interstate commerce have held executive sessions this week to consider various bills before them. The House committee took no action regarding proposed railroad legislation and the Senate committee failed to have a quorum. It is expected that a subcommittee will begin hearings next week on the substitute for the labor provisions of the transportation act proposed by the railroad labor organizations. Some additional bills to abolish the Pullman surcharge have been introduced and Representative Huddleston has introduced in the House a bill, H.R. 7820, similar to that introduced in the Senate by Senator La Follette some time ago, to base rates on the "reasonable cost" of transportation service, including the cost of capital based on the "prudent investment" as determined by the Interstate Commerce Commission.

I. C. C. Requires Competitive Bids on Bond Issue

WASHINGTON, D. C.

IN AUTHORIZING the Chicago Union Station Company to issue and sell $7,000,000 of 5 per cent first mortgage bonds at not less than 94.75, to Kuhn, Loeb & Co., the Interstate Commerce Commission, through Division 4, Commissioners Meyer, Eastman and Potter, has taken occasion to impose a condition that another series of bonds which the company also asked authority to sell, shall be sold to the highest bidder. In their decision the commissioners include a discussion of the question, which was the subject of a hearing on October 26, 1922, of the common practice of railroads of placing bond issues through a single firm of bankers with which they have established relations, and take the position that the time has come to experiment with a requirement of competitive sale. They also say that they know of no good reason why this company in selling its securities should deal with a single financial house but as no objection was found to the already arranged sale of the $7,000,000 of bonds to Kuhn, Loeb & Co., limited the requirement in this case to $850,000 of 4½ per cent bonds, previously issued, for which no arrangement had been made but which the company had desired to sell at not less than 86.5 per cent of par and accrued interest.

In the discussion of the question the commission's report says:

In connection with our administration of section 20a of the interstate commerce act we held a public hearing on October 26, 1922, at which the following questions were submitted for general discussion:

1. Whether and to what extent the commission should, by its order in granting or withholding authorization and approval, determine, limit, or restrict the price at which or the manner in which securities are to be sold and the cost to the carriers of the marketing of securities issued under the provisions of section 20a of the interstate commerce act.

2. Whether it is within the province of the commission to require competitive bidding in the sale of securities so authorized to be issued and whether competitive bidding should be required.

3. If competitive bidding is required, to what class or classes of securities should it be applicable and what regulations or conditions should be prescribed relating to such sales?

These questions were the outcome of our experience in considering requests for authority to issue securities. We had found that carriers rarely, if ever, advertise for competitive bids when marketing new securities, and that they seldom approach or consult more than a single financial house. As a general rule each railroad company has a firm of bankers upon which it depends regularly and uniformly for financial advice, and in issuing securities it deals with no other. The two concerns which do most of this railroad financing are J. P. Morgan & Company and Kuhn, Loeb & Company.

At the hearing above mentioned, this practice of dealing with a single financial house was vigorously supported by representatives of both the bankers and the railroad companies. Summarizing the view, it was argued that railroad securities are quite different from securities, such as State and municipal bonds, which are sold on competitive bids. There are innumerable and wide variations in the kind and quality of railroad securities, dependent upon the earning power of the particular company, the relation between its stock and funded debt, the character of its outstanding mortgages, and similar factors. Expert advice in marketing such securities, resting upon intimate knowledge of the railroad's financial structure and of the likes and dislikes of investors is said to be necessary. The credit of a railroad is dependent upon the success with which it meets in selling its securities. Failure may work irreparable injury to credit, and in this respect a contrast is drawn between a railroad company and a state or a municipality. The continual fluctuations in market conditions often make time a most important element in the sale of securities. Competitive bidding is a process which consumes time, involving delay which may, under certain conditions, prove hazardous.

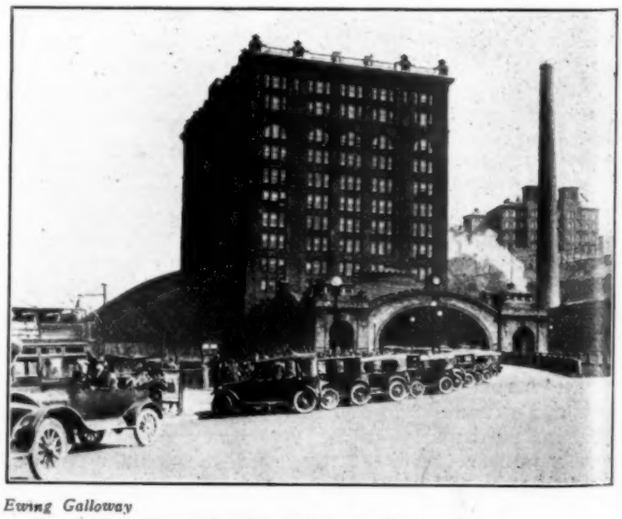
Stress was laid upon the fact that it is necessary to distribute securities much more widely than was once the case. Sales to investors in large blocks are said to be rare and instead railroad securities are now sold in small lots to small investors scattered all over the country. The experience and organization which a large banking house, favorably known to investors, provides is deemed necessary to such distribution. To guard against speculative attacks, it is said to be important that the announcement that securities have been underwritten should be made public simultaneously with the announcement of the proposed issue. This would be impossible if competitive bids were procured. Moreover, carriers deem it an advantage, in times of financial stress or dullness, to have the advice and support of a strong banking concern with intimate knowledge of their affairs, an advantage which can only be gained by regular banking connections.

These and other reasons were offered in support of present practice and in opposition to any requirement of competitive bidding. Nor was there open advocacy of competitive bidding at the public hearing upon the part of any one. The hearing was held at a time when the roads were recovering from a period of traffic depression and when more than normal uncertainty surrounded the marketing of their securities. Conditions were not favorable for experiments. We thought it unwise then to attempt to require any plan of competitive bidding, and felt that the public interest could be sufficiently protected for the time being by fixing, in our orders approving security issues, minimum prices consistent with market conditions below which the securities should not be sold.

The subject was not dismissed, however, from further consideration. While the arguments advanced in favor of present practice have force as applied to carriers of more or less uncertain financial status, they have less force in the case of carriers of assured earning power and favorable financial structure. In this instance applicant is a terminal company owning lands in the heart of Chicago and controlled jointly by four large railroad companies which propose to guarantee its first-mortgage bonds. In the case of such a company marketing such bonds, the arguments advanced against competitive bidding have little weight. We know of no good reason why applicant, in selling its securities, should deal with a single financial house.

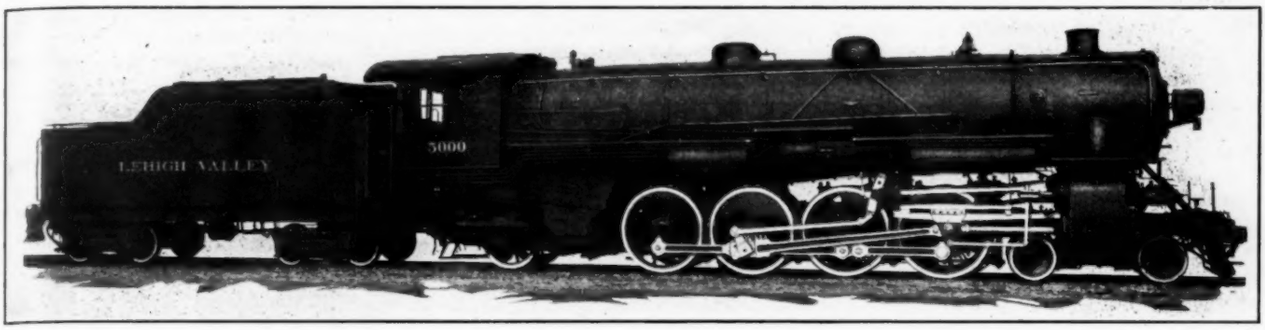
In view of the fact that the applicant prior to our decision herein has sold, subject to our approval, $7,000,000 of the series-B bonds at a price which we believe not to be unreasonable, and which bonds have in turn been offered by the bankers to the public at a reasonable price, we will not in this case compel the applicant to secure competitive bids for that block of bonds. Our authority, however, respecting the sale of the $850,000 of series-A bonds will be on condition that they be sold to the highest bidder after public advertisement for competitive bids.

We find that the proposed issue and sale to Kuhn, Loeb & Company of bonds by the Station Company and the proposed assumption of obligation and liability as guarantors in respect of the series-B bonds by the proprietary companies as aforesaid (a) are for lawful objects within their respective corporate purposes, and compatible with the public interest, which are necessary and appropriate for and consistent with the proper performance by them of service to the public as common carriers, and which will not impair their ability to perform that service, and (b) are reasonably necessary and appropriate for such purposes, upon condition that said $850,000 of such bonds are sold to the highest bidder after public advertisement for competitive bids.



Ewing Galloway

Pennsylvania Station, Pittsburgh



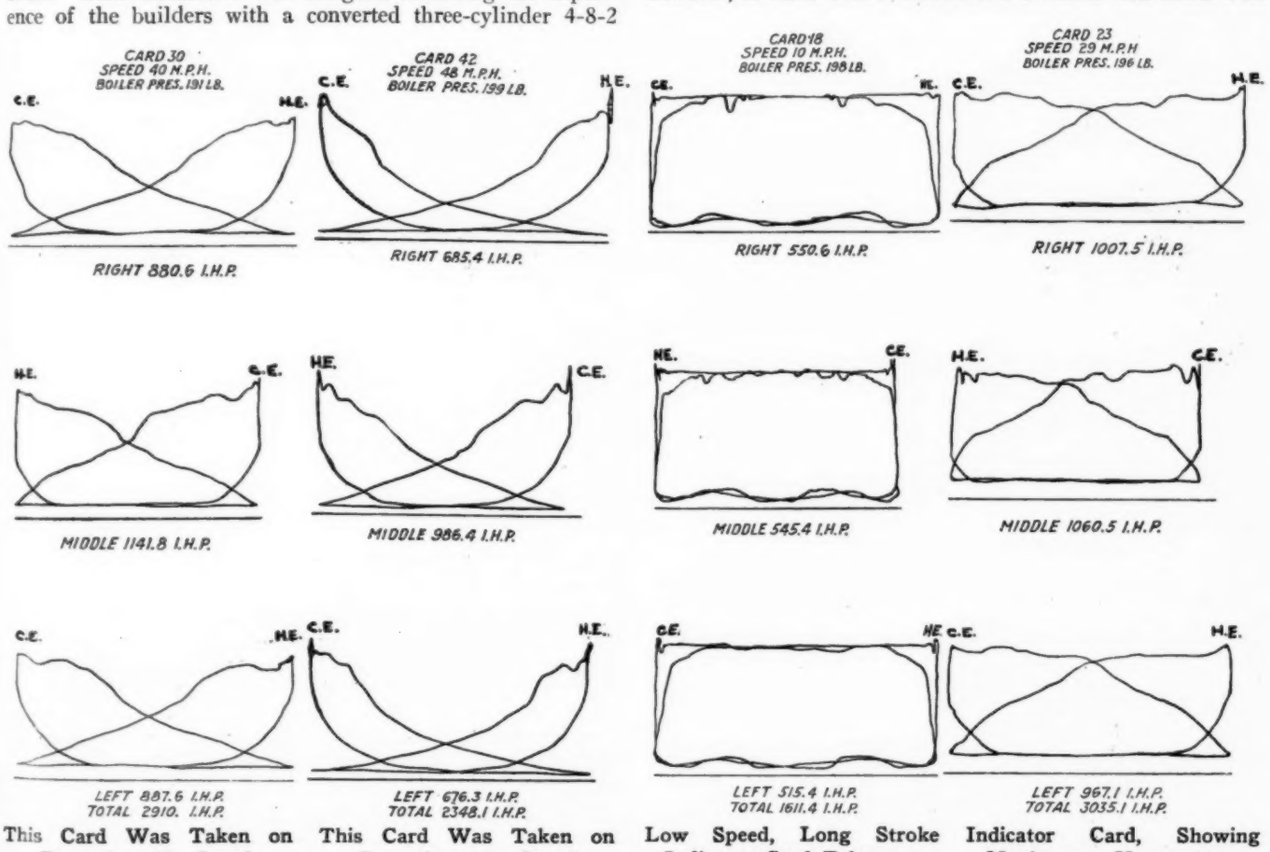
Lehigh Valley Three-Cylinder Simple Mountain Type Locomotive for Freight Service

Lehigh Valley Three-Cylinder Locomotive Tests

4-8-2 Type Built by American Locomotive Co. Handles Heavy Tonnage with Low Fuel Consumption

A THREE-CYLINDER Mountain type locomotive, built by the American Locomotive Company, was placed in operation on the Lehigh Valley during October, 1923. This locomotive was designed following the experience of the builders with a converted three-cylinder 4-8-2 type fast freight locomotive, which was placed in service on the New York Central in 1922.*

The Lehigh Valley locomotive, which is a complete new design, has the same size cylinders and driving wheels as the converted New York Central locomotive. The boiler, however, is built with a combustion chamber and fitted with a Type A, instead of a Type E superheater. Unlike the New York Central locomotive, the main rod of the inside cylinder is connected to the second pair of driving wheels, while the outside main rods are coupled to the third pair of wheels. The principal dimensions and proportions of the Lehigh Valley locomotive are given in one of the tables.



This Card Was Taken on December 29; Speed 40 M.P.H.

This Card Was Taken on December 30; Speed 48 M.P.H.

Low Speed, Long Stroke Indicator Card Taken on December 29

Indicator Card, Showing Maximum Horsepower, Taken on December 29

*This locomotive originally had two 28-in. by 28-in. cylinders. The conversion consisted of applying three 25-in. by 28-in. cylinders, a Type E superheater, an Elesco feedwater heater and an Elvin stoker. For a description of this locomotive see the *Railway Age* for November 3, 1923, page 821.

Road tests of this locomotive, which were run over the Buffalo division on December 29 and 30, to measure the fuel and water performance and the horsepower developed, produced highly satisfactory results. The first 45 miles of the run on December 29 were steadily ascending with maximum grades slightly greater than 21 ft. per mile and an overall difference of elevation of 340 ft., followed by a 20.5-ft. descent for about 10 miles. The run in the opposite direction on December 30, started with 29 miles of slightly rolling grade followed by 14 miles of continuous ascent at the rate of 20.5 ft. per mile and 34 miles of rolling descent for the latter part of which continuous grades of 21.1 per cent prevail. With trains averaging 4,274 tons, the coal consumption averaged 62.7 lb. per 1,000 gross ton miles. The indicator results showed a water consumption per indicated horsepower-hour, including the auxiliaries, of 20.36 lb., a coal consumption per indicated horsepower-hour, including auxiliaries, of 2.72 lb., and a maximum indicated horsepower exceeded 3,000. For the two runs, the overall efficiency of the boiler averaged 77.58 per cent.

Prior to the test, the locomotive was taken into the East Buffalo shops of the Lehigh Valley and equipped with the necessary apparatus for measuring the fuel and water and indicating the cylinders. The tank was fitted with gage glasses at the corners for measuring the water, and was calibrated by weighing out the water in a barrel mounted on a platform scale. A drop bottom coal box was placed in the tender for measuring the coal, the capacity of the box having been checked by dumping and weighing the contents a number of times. Steam temperatures were taken by thermometers placed in the left steam pipe close to the steam chest and in the exhaust passage, and pressure gages were applied to both the saturated and the superheated sides of the superheater header. The boiler pressure was shown on a recording steam gage placed so that it could be read from the indicator box. A speed recorder was placed in the cab and a revolution counter used for checking purposes. Indicators applied to the three cylinders completed the equipment.

A summary of the test data and the results of the two runs made on December 29 and 30 are shown in one of the tables. The first of these runs was made from Tifft Farm to Caledonia, where the necessity of setting out a car for a hot box terminated the tests. This is a distance of 59.4 miles, of which 56.4 miles required the working of the locomotive, and the remaining three miles were drifted. On December 30 a run was made from Manchester to Depew, a trip on which the train drifted for 13 miles. In the test results, no deductions have been made from the fuel and water consumption for this drifting period so that the entire fuel and water consumption is charged against the actual working time of the locomotive.

The average cut-off at which the locomotive worked on this run was 53 per cent and the fuel consumption was 2.56 lb. per indicated horsepower-hour, in which is included the coal required to operate the stoker and air pumps as well as that lost at the pops. In the table, an estimate is given of the coal consumption per indicated horsepower-hour, deducting the amount required for the operation of the auxiliaries. In estimating this deduction care was taken to avoid overstating and rather to understate the amount.

No dynamometer car was available for the foregoing tests

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS OF LEHIGH VALLEY LOCOMOTIVE NO. 5000

Builder	American Loco. Co.
Type of locomotive	4-8-2
Service	Freight
Cylinders, number, diameter and stroke	3—25 in. by 28 in.
Valve gear, type	Walschaert
Weights in working order:	
On drivers	246,500 lb.
On front truck	66,000 lb.
On trailing truck	56,500 lb.
Total engine	369,000 lb.
Tender	201,000 lb.
Wheel bases:	
Driving	18 ft.
Rigid	18 ft.
Total engine	41 ft. 2 in.
Total engine and tender	77 ft. 8 in.
Driving wheels, diameter outside tires	69 in.
Boiler:	
Type	Conical
Steam pressure	200 lb.
Fuel	Bitu. coal
Diameter, first ring, inside	82½ in.
Firebox, length and width	126⅛ in. by 96¼ in.
Combustion chamber length	52 in.
Tubes, number and diameter	230—2¼ in.
Flues, number and diameter	50—5½ in.
Length over tube sheets	21 ft.
Internal area through tubes and flues	10 sq. ft.
Grate area	84.3 sq. ft.
Heating surfaces:	
Firebox, comb. chamber and arch tubes	392 sq. ft.
Tubes	2,832 sq. ft.
Flues	1,505 sq. ft.
Total evaporative	4,729 sq. ft.
Superheating	1,249 sq. ft.
Comb. evaporative and superheating	5,978 sq. ft.
Special equipment:	
Brick arch	Security
Superheater	Type A
Stoker	Elvin
General data estimated:	
Rated tractive force, 85 per cent	64,700 lb.
Cylinder horsepower (Cole)	3,378
Speed at 1,000 ft. piston speed	44.0 m.p.h.
Weight proportions:	
Weight on drivers ÷ total weight engine, per cent	66.9
Weight on drivers ÷ tractive force	3.81
Total weight engine ÷ cylinder hp.	109.2 lb.
Boiler proportions:	
Comb. heat surface ÷ cylinder hp.	1.74
Tractive force ÷ comb. heat. surface	10.83
Tractive force × dia. drivers ÷ comb. heat. surface	749
Cylinder hp. ÷ grate area	40.1
Firebox heat. surface ÷ grate area	4.65
Firebox heat. surface, per cent of evap. heat surface.	8.29
Superheat. surface, per cent of evap. heat. surface	26.42

SUMMARY OF ROAD TESTS OF LEHIGH VALLEY LOCOMOTIVE NO. 5000

Date of test	Dec. 29	Dec. 30	Average
From	Tifft Farm	Manchester	
To	Caledonia	Depew	
Length of run, miles	59.4	77.4	68.4
Working distance, miles	56.4	62.4	59.4
Drifting distance, miles	3.0	15.0	9.0
Time, actual, start to stop, minutes	198	246	222
Time, delays, minutes	9	24	16
Time, running, minutes	189	222	207
Time, drifting, minutes	17	32	24
Number of stops	1	2	1.5
Number of cars in train, including caboose	94	64	79
Gross weight of train, excl. of locomotives	4,619*	3,929*	4,274*
100 ton-miles, based on distance run	2,744	3,041	2,892
Average speed while working, m.p.h.	19.68	19.70	19.69
Average speed while in motion, m.p.h.	18.87	20.92	19.89
Average temp. of feedwater in tank	40.2†	40.0†	40.1†
Average temp. of steam in branch pipe	615.5†	623.0†	619.3†
Average boiler pressure, lb.	185.6	194.1	189.9
Water from tank, lb.	131,840	138,550	135,195
Water lost at inj. overflow (est.), lb.	20	20	20
Water to auxiliaries, lb.	3,720	4,433	4,076
Water lost through pops, lb.	564	1,380	972
Water to cylinders, lb.	127,536	132,717	130,126
Water apparently evaporated per pound of coal as fired	7.288	7.658	7.473
Water app. evap. per hour, working time	45,984	43,746	44,865
Water to superheater per hour, per cent of total	96.75	95.80	96.28
Water per i.hp. per hour, incl. auxiliaries, lb.	21.09	19.63	20.36
Water per i.hp. per hour, less auxiliaries, lb.	20.40	18.80	19.60
Water per 100 ton-miles	48.04	45.55	46.80
Factor of evaporation combined (B.t.u. in steam total divided by 970.4 x total water evaporated)	1.353	1.355	1.354
Coal as fired per hour, working time, lb.	6,310	5,713	6,012
Coal as fired per sq. ft. of grate per hour, lb.	74.85	67.77	71.31
Coal as fired per 100 ton-miles	6.59	5.95	6.27
Coal as fired per i.hp. hour, incl. auxiliaries, lb.	2.89	2.56	2.72
Coal as fired per i.hp. hour, less auxiliaries, lb.	2.81	2.47	2.64
Efficiency, combined, total B.t.u. in steam, divided by total B.t.u. in fuel, times 100	75.94	79.21	77.58
Average indicated hp. of locomotive	2,180	2,228	2,204
Average cut-off of locomotive, per cent of stroke	63.8	52.4	58.1
Maximum indicated hp.	3,035	2,896	2,966
At a speed of, miles per hour	29	46	37.5
Average gage pressure at steam chest	174.0	176.0	175.0

*Tons.
†Deg. F.

and though no record is available of the drawbar pull of the locomotive and its exact performance while starting, it was generally observed that the train started smoothly and quickly, with a noticeable absence of jerks. Its riding qualities are said to be exceptionally smooth and free from lurching and vibration at high speed.

The freight power on the Buffalo division, with which the performance of the three-cylinder Mountain type locomotive may be compared, is largely of the Mikado type with some locomotives of the 2-10-2 type. The lighter Mikados used on this division have a starting tractive force of 59,000 lb. for the locomotive alone and 69,000 lb. for the locomotive with booster. The tonnage rating of these locomotives over this division is 3,000 and 3,500 for the two conditions named, respectively. These locomotives have two cylinders, 27 in. by 30 in., 63-in. driving wheels, and carry 200 lb. boiler pressure. The weight in working order is 237,900 lb. on the drivers and 325,200 lb. total for the engine. The heavier Mikado type locomotives have a tractive force of 63,000 lb. for the engine alone and 73,000 lb. for the engine with booster. These locomotives have a tonnage rating of 3,250 and 3,750 tons, respectively. They have cylinders 27 in. by 32 in., 63-in. driving wheels and also carry 200 lb. boiler pressure. The weight on drivers is 235,500 lb. and the total weight of the engine is 318,000 lb. The Santa Fe type locomotives have a tractive force of 72,600 lb. without the booster and a tonnage rating of 3,500 lb. on the Buffalo division. These engines have 29-in. by 32-in. cylinders, 63-in. driving wheels and carry 200 lb. boiler pressure. The weight on drivers is 289,000 lb. and the total weight of the engine, 370,000 lb.

The three-cylinder Mountain type locomotive, with a tractive force of 64,700 lb., has proved capable of handling trains of 4,500 tons over this division and has received that tonnage rating. It has moved trains of 4,000 tons over the division, a distance of 94 miles, in 4 hrs. 30 min., as compared with running times of 5 hrs. 40 min. for the heavier of the two Mikado type locomotives handling a train of 3,000 tons, and 6 hrs. for the Santa Fe type locomotive with a train of 3,500 tons.

Performance on Grades

Following the tests on the Buffalo division, engine No. 5000 was transferred to the division between Sayre, Pa., and Lehighton, a distance of 145 miles, to determine whether it could operate milk trains over the mountain weighing approximately 1,200 tons, which were regularly handled by Pacific type locomotives, double-headed.

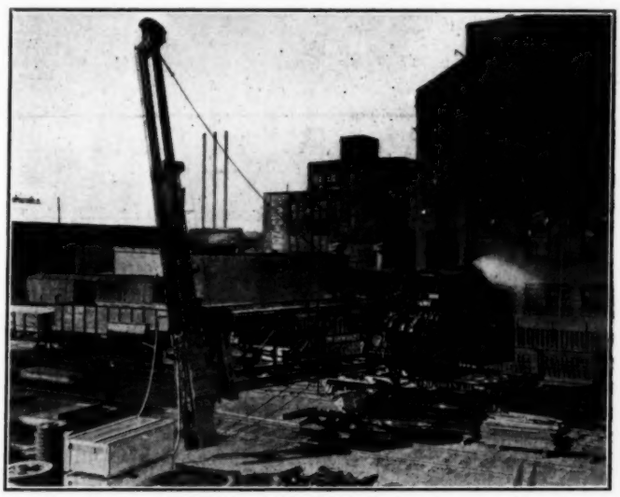
Eastbound, the first 85 miles from Sayre is practically level, with a total decrease in elevation of slightly over 200 ft. to Pittston Junction, just east of Coxton. From this point the grade is steadily ascending to Glen Summit Springs, a distance of 24 miles, of which 13 miles has a ruling grade of 61.5 ft. per mile. From Glen Summit Springs the grade descends to Lehighton with a total difference in elevation of 1,270 ft. From Lehighton west, the first 36 miles is ascending. The last 9 miles of the ascent is at the rate of 63 and 65 ft. per mile, with a comparatively short ruling grade of 69 ft. per mile. From Glen Summit Springs to Pittston Junction, the total decrease in elevation is approximately 1,175 ft.

Eastbound, over the 61.5 per cent ruling grade, the practice has been to operate the milk trains with two Pacific type locomotives, one with a tractive force of 48,720 lb. and the other with a tractive force of 41,530 lb., giving a total of 90,250 lb. The larger locomotive has cylinders 27 in. by 28 in., 73-in. driving wheels, and carries a boiler pressure of 205 lb. The total weight on the drivers of these locomotives is 204,560 lb. The lighter of the two locomotives has 25-in. by 28-in. cylinders, 77-in. drivers and carries a boiler pressure of 215 lb. In this case, the weight on drivers is 161,940 lb. The combined tonnage rating of the two locomotives is 1,300 tons and the average train consists of 19 loads and one caboose.

On the westbound trip, the train load averages 38 empty cars and two cabooses, and is handled by two Pacific type locomotives of the larger class briefly described above. This gives a total tractive effort of 97,440 lb. Locomotive No. 5000 was given a trial trip with a milk train weighing a little over 1,300 tons, which it handled over the mountain without helper service, making schedule time. Since the trial trip, the locomotive has been regularly assigned to this service and, in some cases, has handled trains as heavy as 1,550 tons. On the westbound trip the locomotive has lost a little time on the grade as compared with the schedule made by the two Pacific type locomotives. The schedule over the division, however, has usually been maintained without difficulty, which requires speeds of over 60 miles an hour to be maintained frequently on the level portion of the division.

Combination Heavy Duty Crane and Pile Driver

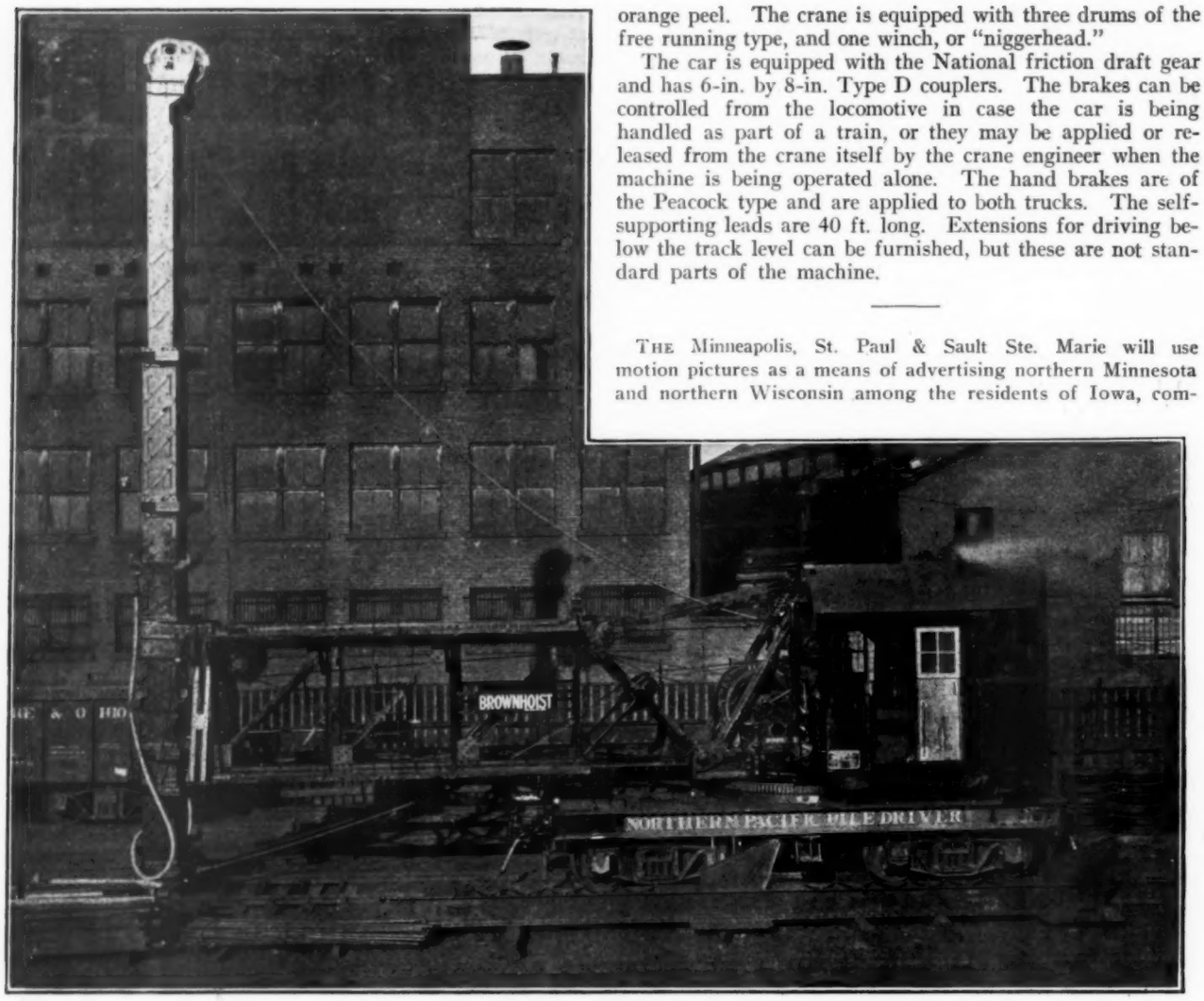
THE Brown Hoisting Machinery Company, Cleveland, Ohio, has recently built for the Northern Pacific a combination heavy duty crane and pile driver which may be revolved 360 deg. in either direction and with which piles may be driven at any point within the circumference of a 32-ft. circle. As shown in the illustration, the machine is equipped with an exceptionally long truss that permits the



Brownhoist No. 6 Pile Driver with Leads in Position to Drive Battering Piles

hammer to operate at a distance of 21 ft. 10 in. ahead of the front axle of the car.

In cases where it is necessary to drive at or above the track level, the pile driver is so equipped that either a steam or drop hammer may be used as desired. Outriggers are provided which will enable the machine to handle piles weighing up to 6,400 lb. together with a steam hammer of the same weight. The battering arrangement permits piles to be driven on a maximum batter of 3½ in. to the foot. The leads are battered through a train of hand operated gearing and, after the desired adjustment has been made, are held in position by a locking pin in order to relieve the gearing of the load. This batter may be varied on either



This Machine is Capable of Driving Piles Straight Ahead or on Either Side of the Track

side of the center and nine positions are available. When the work of driving is completed, the leads may be quickly and compactly folded by power so as to come within clearance limits. A special wedge support is provided to go under the truss and hold it securely when the driver is being moved in a train.

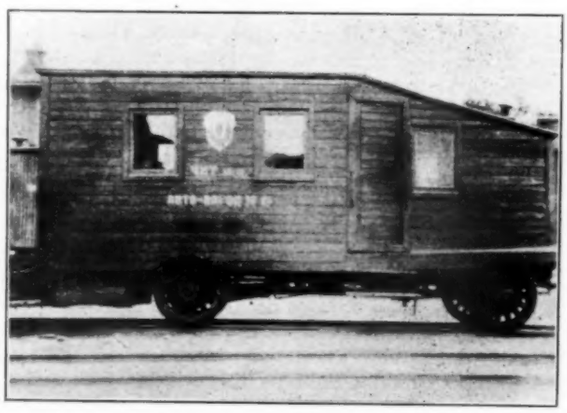
The car itself is 25 ft. 6 in. over the end sills and has a total length over the couplers of 29 ft. 6 in. The total wheel base is 20 ft. 4 in. The truss is so arranged that it overhangs a flat car coupled to the forward end of the pile driver car.

The full working weight of the equipment is 241,000 lb. and the shipping weight is 183,000 lb.

In order to make the change from pile driver to crane, the truss is swung over a car on a parallel track, or over a platform alongside the car, and blocked up. Four pins are then removed from the top and bottom chords, and the ropes and the piping for the steam hammer are disconnected. A locomotive crane boom is then attached in the usual way by blocking it up at the proper level ahead of the crane and running the car up to it. The cables are attached with quick acting rope clamps and after the boom has been reeved, the head end is raised by the crane's own power. Arrangements have also been made so that the boom sheaves may be removed without relieving the strain on the lifting cables. The boom may be equipped with either a grab bucket or orange peel. The crane is equipped with three drums of the free running type, and one winch, or "niggerhead."

The car is equipped with the National friction draft gear and has 6-in. by 8-in. Type D couplers. The brakes can be controlled from the locomotive in case the car is being handled as part of a train, or they may be applied or released from the crane itself by the crane engineer when the machine is being operated alone. The hand brakes are of the Peacock type and are applied to both trucks. The self-supporting leads are 40 ft. long. Extensions for driving below the track level can be furnished, but these are not standard parts of the machine.

THE Minneapolis, St. Paul & Sault Ste. Marie will use motion pictures as a means of advertising northern Minnesota and northern Wisconsin among the residents of Iowa, commencing March 3. The pictures will be shown for three weeks in motion picture theaters in 12 northern counties. The natural resources and the industrial and agricultural developments of the two territories will be described.



Gilliams

A Gasoline Motor Car in Railway Service in Soviet Russia

General News Department

In the United States District Court at Knoxville, Tenn., on February 28, the Louisville & Nashville was fined $900 on charges of violating the safety appliance laws, and the Knoxville & Carolina and the Tennessee Central, $100 each.

The Pere Marquette has been authorized by the Interstate Commerce Commission to make the installation of automatic train control required by the order of January 14, 1924, between Lansing, Mich., and Pennsylvania Junction (Detroit) instead of between Seymour and North Lansing.

The Montreal Express of the Central Vermont was derailed near North Duxbury, Vt., early on the morning of March 11, and six cars were overturned and fell down a bank, lodging on the ice of the Winooski River. Three passengers were killed and 12 were injured. The report says that the cause of the derailment was a broken rail.

John W. Kelly has been a section foreman for the Southern Pacific Company for 44 years and during that time has never found it necessary to make out an accident report for himself or any member of his crew of track laborers. He has been a foreman since 1882 and has worked on sections in Oregon, California, Nevada, Utah, Arizona and New Mexico.

C. P. R. Net After Fixed Charges $24,830,057 in 1923

Results of operations of the Canadian Pacific Railway for the year ended December 31 last were: Gross earnings from railway and lake steamers, $195,837,090; working expenses, including all taxes, $158,358,080; net earnings from railways and lake steamers, $37,479,010; deduct fixed charges, $13,470,653; surplus, $24,830,057; deduct contribution of company to pension fund, $500,000; net revenue from earnings of railway and lake steamers available for dividends, $23,580,357. After payment of all dividends declared for the year the surplus from earnings of railway and lake steamers is $1,633,347. Special income for year after making allowances for contingent reserves, $1,392,052.

Toronto City Council Rejects Railways' Alternative Crossing Elimination Plan

Another complication in the Toronto railway viaduct situation has arisen with the rejection by the city council of Toronto of the modified plan for grade separation along the waterfront as proposed by the engineers of the two railways. The council also declared that it expected the railways to carry out the work under the original viaduct agreement of 1913. The vote of the council stood 26 against the modified plan and 1 for. This flat refusal of the city of Toronto to accept the railways' plan which calls for both viaduct and bridge work along the waterfront to the new union station throws back upon the railways the onus of carrying through the original plan of a straight viaduct from the east end of the city to the station, this to cost about $30,000,000.

Funeral of A. H. Smith

The funeral of A. H. Smith, president of the New York Central, who was killed on March 8, was held at St. Thomas' Episcopal Church, New York City, on Wednesday afternoon, March 12, at 3 p. m. At that hour, all trains on the company's lines were brought to a stop for one minute; and telegraph and telephone instruments, and all machines in the shops were silenced.

The funeral exercises were those of the Episcopal Church and the audience consisted of three parts; those in the church, those in the Commodore Hotel and those listening at radio instruments all over the country. Only about 1,500 persons were able to find room in the church. The services were broadcast by station WJZ of the Radio Corporation of America and thus were available for New York Central employees and others everywhere; while several hundreds of employees were gathered in the ballroom of the hotel, where the radio message was amplified for their benefit. The offices of the railroad company in the Grand Central Terminal were closed in the afternoon.

Stock Shares Offered to Reading Employees

The Reading Company, successor to the Philadelphia & Reading and affiliated railroads, in a circular issued by President A. T. Dice, informs officers and employees that shares of stock in the company may be bought on the instalment plan through the treasurer of the company. The stock consists of first preferred, second preferred and common, and the par value of shares is $50 in all three classes. The preferred shares have paid four per cent dividends for many years, and the common stock pays eight per cent and has done so for 10 years. The common stock now sells in the market at about 10 per cent premium.

The company has no stock for sale, but buys the shares in open market when so requested by an employee through his superior officer. Instalments will be deducted from the payroll monthly and this deduction must be not less than $2 a share on the preferred and $3 on the common. Until stock is paid for, the employee must pay to the company five per cent interest on the company's money necessary to carry the stock. Provision is made in the circular for settling up the accounts in case employee leaves the service, or is absent more than four months, or decides not to complete his contract. The company does not guarantee the employee against depreciation in the market price of the shares.

A New Double Track Railroad 180 Miles Long

The Southern Pacific and the Western Pacific have entered into an agreement for the joint use of their tracks from Alazon (near Wells), Nev., westward to Weso (near Winnemucca), for a period of 50 years. The agreement gives each company double-track service for 180 miles; a double-track railroad by a stroke of the pen. Under the agreement the Western Pacific tracks are to be improved to handle greater traffic. The Western Pacific will also move some traffic for the Southern Pacific between Weso and Chico, near Oroville, over the Sierra Nevada mountains (over 200 miles), as occasion may arise. The minimum traffic to be moved over this "bridge line" in any one year is to be one-half of the traffic moving to and from Oregon points via the Southern Pacific and Ogden, excluding live stock and perishables. The Southern Pacific will perform a similar service between Suisun, Cal., and Sacramento, 41 miles, for both the Sacramento Northern and the Western Pacific. The Pacific Fruit Express Company has acquired by lease the right to operate, together with its own refrigerator cars, all Western Pacific refrigerator cars, under conditions that assure equitable treatment to the shippers of perishable products on both systems. The "bridge" arrangement over the Sierra Nevada mountains gives the Southern Pacific an alternate route between Chico and Weso, which will help to expedite its perishable freight movements over its own tracks through Truckee. The contract provides for payment by each company to the other on the basis of the number of loaded freight cars moved.

Wage Statistics for December

The average number of employees of Class I railroads during the month of December, 1923, was 1,793,779, an increase of 5,189, or 0.3 per cent over the number reported for December, 1922, according to the monthly bulletin of wage statistics issued by the Interstate Commerce Commission. However, owing chiefly to the comparatively excessive overtime payments in December, 1922, there was a decrease in the total compensation of $13,010,507, or 5.3 per cent. The returns for December, 1923, compared with

those for the preceding month, show a decrease in the number of employees of 105,766, or 5.6 per cent, which appears principally in the maintenance groups. Total compensation decreased $15,024,016, or 6.0 per cent.

A comparison of the cumulative returns for the twelve months, 1922 and 1923, shows an increase in 1923 of 14.3 per cent in employment, and of 14.0 per cent in total compensation. The monthly earnings, by groups, were as follows:

	Monthly earnings of—			
	Employees reported on daily basis		Employees reported on hourly basis	
Group	December, 1923	December, 1922	December, 1923	December, 1922
Executives, officials and staff assistants	$429	$418	...	...
Professional, clerical and general	181	177	$123	$121
Maintenance of way and structures	240	237	86	85
Maintenance of equipment and stores	244	244	117	132
Transportation (other than train, engine and yard)	97	96	122	121
Transportation (yardmasters, switch tenders and hostlers)	252	257	147	153
Transportation (train and engine service)	...	...	180	198

New York Railroad Club to Discuss Employees' Magazines

At the next regular meeting of the New York Railroad Club, to be held at 8 p. m. on March 21, 1924, at the Engineering Societies' Building, the subject for discussion will be the employees' magazine. The following will give short talks:

What the Railroad Magazine Does to Improve Morale, by Pitt P. Hand, Editor, New York Central Lines Magazine;

The Railroad Newspaper, by Walton M. Wentz, Editor, Pennsylvania News, Eastern Region;

The Qualifications of a Magazine Editor, by William F. Hooker, Editor, Erie Railroad Magazine;

Inspiring Courtesy and Safety Among Employees, by Henry P. Waugh, Editor, the Interborough Bulletin;

Putting Humanity Into an Employees' Magazine, by J. Watson James, Editor, Chesapeake & Ohio and Hocking Valley Employees' Magazine;

The Reaction of Employees to Magazine, by Joseph A. Frederickson, Editor, B.-M. T. Monthly;

The Railway Employees' Magazines Association, by George Flatow, Editor, Long Island Railroad Information Bulletin;

Interesting the Home Folks, by Miss Margaret Talbott Stevens, Assistant Editor, Baltimore & Ohio Magazine;

The Appeal Spot, by Logan B. Sisson, Editor, Pennsylvania News, Central Region;

Educational Value of the Railroad Employees' Magazine, by Holcombe Parkes, Editor, Norfolk & Western Magazine.

In addition, special entertainment features will be provided.

Canadian National Branch Line Bill Before Parliament This Week

George P. Graham, Minister of Railways and Canals of Canada, proposes to introduce this week in the House of Commons his bill to provide for the construction of branch lines of the Canadian National Railways. He is taking this step much earlier than last session so as to meet one of the demands of the Senate that it be given a longer time in which to consider its provisions. Last session the measure was not given to the Upper Chamber until the last week of the session and the senators declared that they had insufficient time to deal with each item in the bill on its merits and they threw out the entire bill.

Every effort is being made by the Minister of Railways to remove as many as possible of the objections raised against the bill last session. He will, it is understood, cut out some of the larger items of expenditure. The bill last session called for the construction of 29 different branch lines, the total mileage being 1,011 and the total cost $28,291,900, or about $30,000 a mile.

That the government-owned railways still hold a foremost place in the public issues before the people and the Parliament of Canada is shown by the fact that both in the House of Commons and the Senate in the first week of this session almost every speaker in the first debate referred to the showing the Canadian National Railways will make this year and has made in the year past.

To show the need of the branch lines now being proposed Senator F. F. Pardee, speaking in the Upper Chamber last week, said: "There are today 238 miles of graded line without steel; there are 259 miles of newly-laid track without ballast; there are ten locations to lay tracks, and eleven locations to ballast. In all, as I understand, there are in the Western country about 898 miles of railroad or pseudo-railroad ready to take care of the wants of the settlers in those districts. There has been already expended on the locations and roads that I have mentioned $10,000,000, and the government asks that there be granted a little over $28,000,000 to complete the work."

Los Angeles to New York in 70 Hours

A special train carrying Mrs. A. H. Smith to the funeral of her husband, the late president of the New York Central, was this week run from Los Angeles, California, to New York City, 3,197 miles, in 69 hours 7 minutes, said to have been the quickest time ever made on wheels between the two coasts. The route was over the Atchison, Topeka & Santa Fe, the New York Central and the Boston & Albany. The train left Los Angeles on Sunday morning, March 9, and Chicago on Tuesday morning, March 11, and arrived at Chappaqua, N. Y., 33 miles north of Grand Central Terminal, on the Harlem division of the New York Central, Mrs. Smith's destination, on Tuesday evening. The times are as shown below. The second time-column shows Eastern time at each point. The arriving time at New York is given at Mott Haven, five miles short of the Grand Central terminal.

SPECIAL TRAIN, LOS ANGELES TO NEW YORK, MARCH 9-11

Los Angeles, lv.	Sun.	12:12 P. T.	3:12 E. T.
A. T. & S. F., 2,230 miles, 49 h. 18 m.; 45.23 m. p. h.			
Chicago, ar.	Tues.	3:30 C. T.	4:30 E. T.
Dead time, 36 m.			
Chicago, lv.	Tues.	4:06 C. T.	5:06 E. T.
N. Y. C., 821 miles.			
Albany, ar.	.....	.....	.....
Albany, lv.	.....	.....	.....
B. & A., 23 miles.			
Chatham, ar.	.....	.....	.....
Chatham, lv.	.....	.....	.....
N. Y. C., 95 miles.			
Chappaqua, ar.	Tues.	11:57 E. T.	11:57 E. T.
Chicago to Chappaqua, 939 miles, 18 h. 51 m.; 49.81 m. p. h.			
New York (149th St.), ar.	Wed.	12:55 E. T.	.....
Los Angeles to Chappaqua, 3,169 miles, 68 h. 9 m.; 46.50 m. p. h.			
Los Angeles to New York, 3,197 miles; 46.25 m. p. h.			
Chicago to New York, 967 miles; 48.79 m. p. h.			

This was not a record run on either the Santa Fe or the New York Central. From Los Angeles to Chicago the "Scotty" special on July 9, 1905, made the run in 44 hrs. 54 min., and the best record between Chicago and New York is less than 17 hours. This run was made, westbound, on March 27-28, 1909, to carry F. A. Vanderlip. The distance was 959 miles (from 149th street, New York); time 16 hours, 30 minutes; rate 58.12 miles an hour; rate excluding stops, 60.31 miles an hour.

The best previous record from Coast to Coast was on May 5-8, 1906, a special train for E. H. Harriman: 71 hours, 27 minutes, Oakland to New York, over the Southern Pacific, Union Pacific, Chicago & North Western, Lake Shore & Michigan Southern and the New York Central.

Railway Returns for January

Class I railroads earned a net railway operating income of $51,281,200 at an annual rate of 4.54 per cent on their valuation in January, according to reports compiled by the Bureau of Railway Economics from returns filed with the Interstate Commerce Commission. In the Eastern district the rate earned was 5.04 per cent; in the Southern district 5.68 per cent and in the Western district, 3.59 per cent.

The same roads in January last year earned a net railway operating income of $61,128,970 which was at the annual rate of 5.58 per cent. In December, 1923, the net operating income was $69,694,744 or 4.44 per cent. Operating revenues in January amounted to $468,976,600, a decrease of $33,565,250 or 6.7 per cent, while operating expenses totaled $384,984,380, a decrease of $23,993,100 or 5.9 per cent.

Class I railroads in January paid $26,000,000 in state and federal taxes, or approximately $867,000 a day. This was an increase of about 1½ per cent over the amount paid in January, 1923. Expenditures for maintenance of equipment during the month showed a decrease of approximately

$12,700,000 from the same month last year, while for maintenance of way the amount spent was an increase of approximately $2,423,000.

Compilations by the Bureau of Railway Economics show that the rate of return in January based on the property investment of the carriers was 3.94 per cent. Net operating income by sub-districts for the month with the percentage of return based on property investment in each district follows:

New England Region	$1,611,851	3.15 per cent
Great Lakes Region	9,594,610	4.78 per cent
Ohio-Indiana-Allegheny Region	10,131,222	4.21 per cent
Pocahontas Region	3,064,595	4.61 per cent
Southern Region	10,128,204	4.88 per cent
Northwestern Region	2,313,591	1.24 per cent
Central Western Region	9,346,463	3.97 per cent
Southwestern Region	5,090,676	4.48 per cent

Forty-four Class I railroads operated at a loss in January, of which 20 were in the Eastern, 2 in the Southern and 22 in the Western district. In December, 47 railroads had operating deficits.

Reduction in Western Canadian Rates Seen as Government Decides to Restore Agreement

A decision of far-reaching effect upon the railways of Canada has been reached by the Dominion government. It was made known last week that nothing will be done to prevent the coming into effect again on July 7 next of the Crow's Nest Pass agreement (*Railway Age*, October 13, 1923, page 673) which means that, although the pact was entered into between the Dominion government and the Canadian Pacific Railway only, as a result of competition the freight rate reductions provided in that agreement will affect both roads in Western Canada. The actual extent in percentage of the lowering of rates cannot yet be determined because, while the agreement which became first operative in 1897 or 1898 provided for an average reduction of 10 per cent, many fluctuations of the freight tariff have taken place since that time.

The reduction of an average of 10 per cent was on the westbound movement of freight but it also provided for certain reductions on eastbound grain and flour. The action of the government in permitting the agreement to again come into full force is taken to implement its promises to do all possible to facilitate the movement to the world markets of the products of Western Canada, and it will be particularly welcomed by the Progressive party in the House of Commons which since its inception has demanded a substantial cut in freight rates or the return to effect of that agreement.

This pact affecting Western freight rates was entered into between the Dominion government and the Canadian Pacific in 1897, the agreement taking the form of a subsidy contract for the construction by that road of a line from Lethbridge in Alberta to a point in Eastern British Columbia. The road undertook the construction on the promise of a subsidy of $11,000 a mile. Eventually the road was built and the total subsidy amounted to $3,400,000. Concurrently with the subsidy contract, the government and the C. P. R. entered into an agreement concerning the freight rates that were to be charged by that railway on certain specified commodities. At that time there was no Dominion Railway Board or other body to control rates, other than the federal government.

These reduced rates were applicable on the specified articles in movements westbound from and including Fort William to all points west of Fort William on the company's main line. The purpose was to afford the settlers of the prairie provinces of that day the lowest possible rate upon the articles of merchandise which they most required, and which were not obtainable in those provinces.

During the latter part of the great war, as a result of demands from the railways for a tariff that would enable them to meet the higher cost of operation and maintenance, the government ordered their suspension up to July 7, 1922. A few months before that date a change of government occurred at Ottawa and the Liberals who formed the new government were beset by demands from the new political group from Western Canada—the Progressives—for the return of the agreement to either full or partial effect, the latter to at least include the agreement's rates on grain and flour. In the session of 1922 W. C. Kennedy, then Minister of Railways and Canals, moved for a special parliamentary committee to consider this Western freight rate situation. After a long and lively sitting occupying most of the parliamentary session a report was brought in and adopted by Parliament providing for the further suspension of the agreement for one year, with the exception that its schedule on grain and flour should become operative.

In June of last year (1923) the government passed an order-in-council extending the suspension, with the above mentioned exception, for still another year. That term expires on July 7 next and the decision of the government made known last week to take no steps to prevent the pact from coming into full force again will be hailed with delight by the Progressives representing the Western producers and will not be warmly welcomed by the railways.

During the sittings of the special parliamentary committee in the session of 1922 the heads of the two principal railways appeared before the committee to oppose the return of the Agreement to operation. E. W. Beatty, president of the Canadian Pacific, declared that the application of the agreement's rates to the 1921 traffic, with the other then existing rates in effect, would mean a decrease in the earnings of that road of $14,000,000, of which $7,000,000 would be from grain. D. B. Hanna, then head of the Canadian National, stated that his road would lose about $10,000,000. In his annual railway statement presented to Parliament last session George P. Graham, Minister of Railways and Canals, showed that these two estimates were probably not excessive.

Work of Dominion Railway Board in 1923

During the year of 1923 the Dominion Board of Railway Commissioners held public sittings at which 190 applications were heard. The total sittings were 48, of which 27 were in Ontario, 1 in Quebec, 3 in Manitoba, 2 in Saskatchewan, 7 in Alberta, 6 in British Columbia and 2 in Nova Scotia. Of a total of 3,288 applications and complaints received and dealt with by the Board, 94 per cent were disposed of without the necessity of formal hearing.

Provision was made in the Railway Act of 1919 that the sum of $200,000 each year, for 10 consecutive years from April 1, 1919, be appropriated and set apart for the purpose of aiding in the providing by actual construction work of protective safety and conveniences for the public in respect of highway crossings of the railways at rail level. In dealing with this matter the Board issued between April 1, 1919 and December 31, 1923, 554 orders providing protection for 614 crossings.

In the Traffic Department of the Board 68,892 tariffs were filed and revised. These included: Freight tariffs, including supplements, 53,096; passenger tariffs, including supplements, 10,776; express tariffs, 2,096; telephone tariffs, 2,650; sleeping and parlor car tariffs, 236; telegraph tariffs, 38. The total number of schedules filed from February 1, 1904, to December 31, 1923, was 1,201,445.

In the Engineering Department of the Board a large number of inspections were made covering the whole Dominion. These inspections for the year 1923 totalled 362, and cover inspections for the opening of a railway for the carriage of traffic, inspections of culverts, highway crossings, cattle guards, road crossings, bridges, subways and other general inspections.

According to the report of the Board's chief operating officer the number of accidents in 1923 was 3,187, covering 295 persons killed and 3,597 persons injured, as compared with 2,588 accidents in 1922 of which 243 were persons killed and 2,856 persons injured.

Fifteen passengers were killed last year, as compared with 5 in the previous year, and 558 passengers were injured last year as compared with 376 in 1922. The number of employees killed last year was 122, as compared with 83 in 1922, and 2,542 were injured in 1923, as compared with 2,084 in 1922. The number of others killed was 158 last year as compared with 155 in 1922, and the number of others injured was 497 last year as compared with 396 in 1922.

There were 921 railway accidents last year on highway crossings and 316 persons were killed and 1,155 injured. There were 210 accidents at protected crossings where 72 persons were killed and 230 injured. At unprotected crossings there were 710 accidents where 244 persons were killed and 925 injured.

During 1923 a total of 1,096 fires from all causes were reported as having originated within 300 feet of railway territory. Of these 254 fires burned over less than one-fourth acre each, doing no damage, while 742 larger fires are reported to have burned over 785,908 acres and destroyed forest growth, forest products and other property valued at $1,079,154. Of the total 78.56 per cent are definitely attributed to railway agencies. During last year the fire-protective appliances on 3,498 locomotives were inspected and only 3.3 per cent were found defective.

Traffic News

The Chicago & Eastern Illinois and the Missouri Pacific on March 10 inaugurated a daily package car service between Chicago and Memphis, Tenn., giving third morning deliveries in Memphis.

The Terminal Railroad Association of St. Louis interchanged 348,802 cars between connections during February, compared with 290,469 cars during the same period in 1923; an increase of 18 per cent.

Section 28 of Merchant Marine Act Put Into Effect

The Interstate Commerce Commission on March 11 took action to put into effect the provisions of section 28 of the merchant marine act of 1920, which provides for limiting reduced export and import rates by rail to commerce handled by water in American ships, by issuing an order lifting its previous suspension of the provisions of the act as to certain traffic in accordance with a certificate from the United States Shipping Board.

Section 28 of the Merchant Marine Act, 1920, provides as follows:

That no common carrier shall charge, collect or receive, for transportation subject to the Interstate Commerce Act of persons or property, under any joint rate, fare or charge, or under any export, import or other proportional rate, fare or charge, which is based in whole or in part on the fact that the persons or property affected thereby is to be transported to, or has been transported from, any port in a possession or dependency of the United States, or in a foreign country, by a carrier by water in foreign commerce, any lower rate, fare or charge than that charged, collected or received by it for the transportation of persons, or of a like kind of property, for the same distance in the same direction, and over the same route, in connection with commerce wholly within the United States, unless the vessel so transporting such persons or property is, or unless it was at the time of such transportation by water, documented under the laws of the United States. Whenever the board is of the opinion, however, that adequate shipping facilities to or from any port in a possession or dependency of the United States or a foreign country are not afforded by vessels so documented, it shall certify this fact to the Interstate Commerce Commission, and the Commission may, by order, suspend the operation of the provisions of this section with respect to the rates, fares and charges for the transportation by rail of persons and property transported from, or to be transported, to such ports, for such length of time and under such terms and conditions as it may prescribe in such order, or in any order supplemental thereto. Such suspension of operation of the provisions of this section may be terminated by order of the Commission whenever the board is of the opinion that adequate shipping facilities by such vessels to such ports are afforded and shall so certify to the Commission.

In accordance with the provisions of that section, the United States Shipping Board had certified to the commission that adequate shipping facilities have heretofore not been afforded by vessels documented under the laws of the United States and accordingly the commission by orders entered June 14, 1920, July 27, 1920, and December 11, 1920, suspended the provisions of section 28 until further order of the commission.

On March 1, 1924, the commission received from the United States Shipping Board the resolution which the board adopted on February 27, 1924, and transmitted to the commission under date of February 29, 1924, certifying that adequate shipping facilities are now available to handle the transportation of all commodities other than grain between ports of the United States and ports of Great Britain and Northern Ireland and the Irish Free State, the ports of Continental Europe North of and including Bordeaux and the East Coast of Asia, the Islands of the Pacific Ocean, Australia and the East India Islands and the ports of Central and South America.

The commission announced that it construes section 28 as requiring it to lift the suspension of said section in accordance with the certification of the Shipping Board and accordingly by an order entered on March 11, 1924, the suspension brought about by the three former orders above enumerated has been lifted with respect to the traffic above described.

The interstate commerce act provides that all rates and charges of common carriers between points in the United States shall be published and filed in accordance with regulations prescribed by the commission. The commission has therefore felt it necessary that sufficient notice be given of the lifting of the suspension to enable carriers to amend their tariffs in an orderly manner. Accordingly it has made its order effective May 20, 1924, and has provided for publication upon not less than 15 days' notice in lieu of the 30 days' notice usually required, in order that all parties interested may be fully advised and that as little confusion and disturbance of commercial conditions as possible will result.

Commission and Court News

Interstate Commerce Commission

The Commission has again postponed the effective date of its assigned car order, from April 1 to June 1.

The Interstate Commerce Commission has re-opened its proceeding of investigation regarding the construction and repair of railway equipment for further hearing is so far as the Erie is involved.

The Commission has announced that oral arguments regarding the proposed regulations for depreciation charges of steam railroads will be heard by the full commission at Washington on April 18.

The Commission's investigation into the efficiency and economy of railroad management, insofar as it concerns the Lehigh Valley, has been assigned for further hearing at Washington before Division 5.

The Commission has reopened for further hearing its interchangeable mileage ticket investigation, in response to petitions filed on behalf of the International Federation of Commercial Travelers' Organizations, the National Council of Traveling Salesmen's Associations, and the National Association of Men's Apparel Clubs.

The hearing in New York City on transcontinental freight rates was concluded on March 7. Representatives of steamship lines gave voluminous testimony concerning rates by water from New York to the Pacific Coast. R. W. Garrow of the Luckenbach Line believed it necessary for the water lines to make rates at least $2 a ton less than those of the railways in order to get an appreciable amount of freight. The Intermediate Rate Association, representing interests in Utah, Idaho and other mountain states, presented arguments against making rates from the Chicago region to the Pacific Coast any less than those from the Mountain region.

The Missouri-Kansas-Texas has filed a complaint with the Interstate Commerce Commission asking it to fix the terms on which it shall pay for the use of the terminal facilities of the Kansas City Terminal and to issue an emergency order allowing it to use the terminal pending such decision. The complaint says that the company considers the operating agreement under which it has used the terminal facilities, which required it to pay one-twelfth of the interest, taxes, etc., of the Terminal property, unjust and unreasonable, that it has elected not to become a proprietary company and not to adopt the contracts between the Terminal company and the old Missouri, Kansas & Texas Company, but that it desires to use the facilities and pay on a user basis, but the Terminal company has declined to allow it to do so except on the basis of the old contract.

State Commissions

The Pelham & Havana Railroad which runs from Cairo, Ga., on the Atlantic Coast Line southwest 24 miles to Havana, Fla., on the Georgia, Florida & Alabama, has requested authority to abandon the operation of the road; and the Georgia Public Service Commission, acting on a request of the Interstate Commerce Commission, will hold a hearing on the question at Thomasville, Ga., on April 15. The Florida Public Service Commission has been invited to sit with the Georgia Commission at the hearing.

United States Supreme Court

The Chicago Junction Case

In this case, briefly reported last week, page 576, there were six plaintiffs. On May 16, 1922, the New York Central obtained from the Interstate Commerce Commission an order authorizing it to acquire the stock of the Chicago River & Indiana, and authorizing the latter company to lease the Chicago Junction Railway, the two last mentioned being terminal railroads within the Chicago switching district. Chicago Junction Case 71 I. C. C. 631. Prior to that date they were operated as independent belt lines, uncontrolled by any trunk line carrier, and they were used by the 23

railroads entering Chicago impartially and without discrimination. Among these the six chief competitors of the New York Central were the Baltimore & Ohio, the Pennsylvania, the Chicago & Erie, the Grand Trunk Western, the Chicago, Indianapolis & Louisville, and the Pittsburgh, Cincinnati, Chicago & St. Louis. In 1923 these six railroads brought suit in the Federal Court for the Eastern District of Illinois against the Federal Government, the Commission, the New York Central, the terminal railroads and the stockholders thereof, to have the order declared void and the *status quo* restored, and for an injunction. That court, without opinion, denied the injunction and dismissed the bill. The plaintiff appealed direct to the United States Supreme Court.

First. The plaintiffs contended that the order was void because there was no evidence to support the finding that the acquisition of control of the terminal railroads by the New York Central "will be in the public interest." The defendants conceded that the New York Central could not legally acquire control of these terminal railroads unless authorized so to do by the Commission pursuant to paragraph 2 of section 5 of the Act to Regulate Commerce; and that the Commission could not legally grant such authority unless it finds, after hearing, that the acquisition "will be in the public interest." They contended that this order was not one of those subject to judicial review; and that, if subject to review, it could not be held void merely because unsupported by evidence. It was further contended by defendants that the act confers a power purely discretionary, and therefore the order could not be set aside merely because based on facts erroneously assumed, or of which there was no evidence.

The Supreme Court holds that the power here challenged was not of such discretionary character. "Upon application of a carrier," the court said, "the Commission must form a judgment whether the acquisition proposed will be in the public interest. It may form this judgment only after hearing. The provision for hearing implies both the privilege of introducing evidence and the duty of deciding in accordance with it. To refuse to consider evidence introduced or to make a final finding without supporting evidence is arbitrary action. As it was admitted by the motion that the order was unsupported by evidence, and since such an order is void, there is no occasion to consider the other grounds of invalidity asserted by plantiffs."

Second. The defendants contended that the plaintiffs had not the legal interest necessary to entitle them to challenge the order. That they had in fact a vital interest was admitted. They are competitors of the New York Central. The diversion of traffic had already subjected them to irreparable injury. The loss sustained exceeded $10,000,000. Continued control by the New York Central would subject them to an annual loss in net earnings of approximately that amount. The Supreme Court in its opinion said that: "This loss is not the incident of more effective competition. It is injury inflicted by denying to the plaintiffs equality of treatment. To such treatment carriers are, under the Interstate Commerce Act, as fully entitled as any shipper. It is true that, before the Transportation Act, 1920, the Interstate Commerce Act would not have prohibited the owners of the terminal railroads from selling them to the New York Central. Nor would it have prohibited the latter company from making the purchase. And, by reason of a provision contained in section 3 of the Interstate Commerce Act, the purchase might have enabled the New York Central to exclude all other carriers from use of the terminals. But Transportation Act, 1920, repealed that provision in section 3; it made provision for securing joint use of terminals; and it prohibited any acquisition of a railroad by a carrier, unless authorized by the Commission. By reason of this legislation, the plaintiffs, being competitors of the New York Central and users of the terminal railroads theretofore neutral, have a special interest in the proposal to transfer the control to that company."

The Supreme Court rejected the defendants' contentions that the bill was properly dismissed for want of jurisdiction, and that the suit was barred by laches. The decree of the district court was reversed. Baltimore & Ohio v. United States. Decided March 3, 1924. Opinion by Justice Brandeis.

Justice Sutherland, in a dissenting opinion, in which Justices McReynolds and Sanford concurred, said, in part: "I think the injuries alleged to have been sustained by complainants are not such as to afford the basis for a legal remedy. Complainants are interested only in the sense that the acquisition of the rights here in question by their competitor will enable the other to absorb a larger share of the business. That is not enough to constitute a remediable interest."

Labor News

The shop crafts employees on the Southern Railway have filed with the management of the road a request for wage increases. The increase asked is four cents an hour.

The Pullman Company has granted an increase of eight per cent in wages to its porters. The increase will affect between 9,000 and 10,000 parlor and sleeping car porters and will aggregate $1,000,000 annually. The wages of the conductors employed by the Pullman Company were recently advanced six per cent.

The Delaware, Lackawanna & Western and the Reading Company have increased the pay of locomotive enginemen and firemen substantially on the basis granted by the New York Central in its recent contract with these employees; approximately five per cent. The Delaware, Lackawanna & Western agreement is effective as from March 1 and the Reading from March 15.

Wage negotiations between western railroads and the Order of Railroad Conductors and the Brotherhood of Railway Trainmen will be opened at Chicago within a week. The employees presented their demands some time ago and asked for a joint conference. The roads are soon to announce whether they will meet the employees in joint conference or on the part of each road by itself.

Negotiations between the Baltimore & Ohio, the Brotherhood of Railroad Trainmen and the Order of Railway Conductors on the employees' request for wage increases are nearing conclusion, according to W. G. Lee, president of the Brotherhood of Railroad Trainmen. A wage increase of five per cent, such as has been granted by the New York Central, has been agreed upon, Mr. Lee said. Changes in working rules are now being considered.

The Pennsylvania Railroad announced on Wednesday of this week the conclusion of an agreement with representatives of the enginemen, firemen, hostlers and hostler helpers for increases of pay and changes in regulations. The new rates of pay are to date from January 16, while the new regulations go into effect on April 1. About 22,000 employees are affected and the increase is approximately five per cent. The basic daily rate in passenger service is increased 24 cents a day, in freight service 36 cents and yard service 32 cents.

Wage Negotiations With Canadian Employees' Brotherhood

Negotiations for the upward revision of wage schedules to the 1920 level have been reopened between a committee representing the station, shop, shed, round-house, clerical and other employees and a committee representing the management of the Canadian National Railways. The average increase over the present wages sought by the men is 12½ per cent. Negotiations are being conducted in Montreal. Notice was given last summer by the employees that they desired a revision of the wage schedule and of working conditions and their committee met a committee of the C. N. R. management, under A. E. Crilly, chief of the wage bureau. Activities were suspended pending the convention of the Canadian Brotherhood of Railway Employees.

THE MARYLAND & DELAWARE COAST RAILROAD is the name of an organization which is said to be preparing to buy that part of the Maryland, Delaware & Virginia which was abandoned last year because of lack of business; but it does not appear that the new company has as yet got farther than to negotiate with the E. B. Leaf Company, of Philadelphia, which concern deals in junk and which bought the road at foreclosure sale last May. The plans of the new company contemplate operation, probably with gasoline cars, from West Denton, Md., to Lewes, Del.; and it is expected also to arrange with the Pennsylvania for the operation of trains westward to Love Point and eastward from Lewes to Rehoboth.

Equipment and Supplies

Locomotives

THE SOUTHERN PACIFIC is inquiring for 6 electric locomotives.

THE TENNESSEE, ALABAMA & GEORGIA has ordered one Consolidation type locomotive from the Baldwin Locomotive Works.

THE THOMSEN-CLARK TIMBER COMPANY, Ltd., Vancouver, B. C., has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

THE CHICAGO, ROCK ISLAND & PACIFIC, reported in the *Railway Age* of February 23 as contemplating buying 10 locomotives, is now inquiring for 10 Mountain type locomotives.

THE UTAH COPPER COMPANY, reported in the *Railway Age* of February 9 as inquiring for two 0-6-0 switching type locomotives, has ordered 3 locomotives of this type from the Baldwin Locomotive Works.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of January 26 as inquiring for 20 Pacific type and 5 switching type locomotives has ordered this equipment from the Baldwin Locomotive Works.

THE NEW YORK, CHICAGO & ST. LOUIS, reported in the *Railway Age* of February 23 as inquiring for 10, 8-wheel switching type locomotives and 10 Mikado type locomotives, has ordered this equipment from the Lima Locomotive Works.

Freight Cars

THE CHESAPEAKE & OHIO is inquiring for 600 Hart ballast cars of 50 tons' capacity.

THE AMERICAN SMELTING & REFINING CO. is inquiring for 15 ore cars of 60 tons' capacity.

THE CANADIAN NATIONAL has ordered 50 caboose cars from the Canadian Car & Foundry Co.

THE BALTIMORE & OHIO is reported to be inquiring for prices on the rebuilding of 500 freight cars.

THE PACIFIC COAST RAILROAD has ordered 60 flat cars and 25 box cars from the Pacific Car & Foundry Co.

THE LOUISVILLE & NASHVILLE has ordered 100 Hart combination ballast cars from the Roger Ballast Car Company.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of February 2 as inquiring for prices on the repair of 2095 freight cars, has placed an order for the repair of 195 flat cars and 900 box cars with the Pullman Company, and the repairs to 1,000 box cars with the Ryan Car Company.

THE NEW YORK, CHICAGO & ST. LOUIS, reported in *Railway Age* of February 9 as inquiring for 300 steel underframe, double deck stock cars and 1,000 automobile box cars, has ordered the 300 stock cars from the General American Car Company, and the 1,000 automobile box cars from the Illinois Car Manufacturing Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of February 23 as inquiring for 1,250, all steel, low side gondola cars of 50 tons' capacity and 750 steel frame hopper cars of 50 tons' capacity, has ordered 1,200 of the gondola type cars from the Standard Steel Car Company and 800 of the hopper cars from the Chickasaw Shipbuilding & Car Company.

THE ATLANTIC COAST LINE, reported in *Railway Age* of February 9 as inquiring for 50 steel ballast cars, has ordered this equipment from the Virginia Bridge & Iron Co. This company which was also reported in *Railway Age* of February 23 as inquiring for 50 steel underframes for caboose cars, has placed an order for 30 of these underframes with the Virginia Bridge & Iron Co.

Passenger Cars

THE LOUISVILLE & NASHVILLE is inquiring for 34 all-steel passenger cars.

THE EL PASO & SOUTHWESTERN is inquiring for from 1 to 3 dining cars.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for eight dining cars and five head-end buffet-baggage cars.

THE BESSEMER & LAKE ERIE is inquiring for 6 combination baggage and passenger cars, 3 combination baggage and mail cars and 3 baggage cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 4 combination mail and express cars, 3 combination baggage and express cars and 5 all-steel coaches.

THE GREAT NORTHERN, reported in the *Railway Age* of February 9 as inquiring for 50 refrigerator express cars, has ordered this equipment from the Siems Stemble Company.

THE NEW YORK CENTRAL, reported in the *Railway Age* of March 8 as contemplating buying about 25 horse express cars is now inquiring for 28 horse express cars 70 ft. long.

THE CANADIAN NATIONAL has ordered 20 steel baggage cars from the National Steel Car Corporation and 20 first class coaches and 15 steel mail and baggage cars from the Canadian Car & Foundry Co.

THE ATLANTIC COAST LINE, reported in *Railway Age* of February 2 as inquiring for 10 express cars and 7 combination mail and baggage cars, has ordered 10 baggage cars and 7 combination mail and baggage cars from the Standard Steel Car Company.

Iron and Steel

THE CANADIAN NATIONAL has placed orders for 96,000 tons of 85 pound and 100 pound rail.

THE BUFFALO, ROCHESTER & PITTSBURGH has ordered 5,500 tons of rail from the Carnegie Steel Company.

THE DELAWARE, LACKAWANA & WESTERN has ordered 500 tons of steel for bridges from the American Bridge Company.

THE JOINT BRIDGE COMMISSION, Philadelphia, Pa., will receive bids on March 19 for 19,000 tons of steel for the Camden-Philadelphia bridge.

THE CHICAGO, BURLINGTON & QUINCY has ordered 674 tons of structural steel, consisting of miscellaneous girders and I-beam spans, from the American Bridge Company.

THE NEW YORK, CHICAGO & ST. LOUIS has divided an order for rails between the United States Steel Corporation, Bethlehem Steel Company and the Inland Steel Company.

THE PENNSYLVANIA has placed orders for 194,000 tons of rail for its 1924 requirements as follows: Bethlehem Steel Company, 88,000 tons; Carnegie Steel Company, 61,000 tons; Illinois Steel Company, 33,000 tons and Inland Steel Company, 12,000 tons.

Signaling

THE SOUTHERN PACIFIC COMPANY is to install automatic block signals on its lines east of Los Angeles, using 196 Style "B" semaphores, ordered from the Union Switch & Signal Company; a total of 150 one-arm and 46 two-arm signals; also 457 neutral relays and 102 "DNL" relays for approach lighting of these automatic signals.

THE PACIFIC ELECTRIC RAILWAY has ordered from the Union Switch & Signal Company materials for signaling its double track line between Dominguez, Cal., and San Pedro, Cal., using color light signals. There will be 42 Style "N" signals, 105 single impedance bond layouts, 130 a.c. relays and 94 vertical rotary switch circuit controllers.

Supply Trade News

John W. Shoop, office manager of the **Lehon Company,** Chicago, has been promoted to manager of railway sales, with headquarters at Chicago.

Herbert J. Mayer, sales representative of the **Hayes Track Appliance Company,** with headquarters at Richmond, Ind., has been promoted to sales manager.

H. K. Lowry, whose appointment as signal engineer and general representative of the **Sprague Safety Control and Signal Corporation,** with headquarters at Chicago, was announced in the *Railway Age* of March 8, was born on March 24, 1880, at Milwaukee, Wis., and was educated at Massachusetts Institute of Technology. After completing his education he entered railway service on July 1, 1914, as a laborer on mechanical interlocking construction with the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., and in 1905 was transferred to the drafting department. On October 1, 1906, he was appointed signal inspector, which position he held until December 1, 1908, when he was appointed assistant signal engineer. He held this position until June 1, 1912. On July 15, 1912, he accepted a position with the Chicago, Rock Island & Pacific as superintendent of construction in the signal department, with headquarters at Chicago. On July 15, 1913, he was promoted to assistant signal engineer, and on account of the reorganization of the department on August 1, 1913, he was given the title of principal assistant signal engineer. He held this position until May 1, 1914, when he was promoted to signal engineer, with the same headquarters, which position he has held until his recent appointment.

H. K. Lowry

J. T. Stephenson has been appointed railway sales representative in the southern territory for the **Chicago Railway Signal & Supply Co.,** Chicago, with headquarters at Washington, D. C.

C. H. Pridey, salesman of **S. F. Bowser & Co.,** with headquarters at St. Louis, Mo., has been promoted to superintendent of the Kansas City district with headquarters at Kansas City.

F. E. Finley, formerly manager railway sales, Laclede Steel Company, has become associated with the **Kansas City Bolt & Nut Company,** as district sales agent, with headquarters at St. Louis, Mo.

Frederic E. Wright, instead of L. A. Hull, has joined the sales department of the **International Oxygen Company,** Newark, N. J. The arrangement with Mr. Hull, which was announced in our issue of March 8, was not consummated.

The Morton Manufacturing Company, Chicago, has appointed the **Consolidated Equipment Company** as its representative for the sale of Acme Line of Railway Appliances for the Dominion of Canada with headquarters at 260 St. James street, **Montreal, Que.**

The Ward Railway Equipment Company, Lima, Ohio, has been incorporated for $50,000, to manufacture miscellaneous equipment for railroads. The incorporators are **O. G. Snyder, Edward P. Kirly, George T. Shanbow, B. E. Parish, J. T. Ward, Charles Ershick** and **J. B. Rowntree.**

The Galion Iron Works & Mfg. Company, Galion, Ohio, is organizing a railroad sales department. The St. Louis office, handling the central and western territory, has been placed in charge of **Taylor D. Kelley** and **Harvey DeCamp.** The company will specialize on 25, 50 and 100-ton coal tipples and railroad cinder hoists.

The Graver Corporation has moved its railroad office from 1412 Steger building, Chicago, to the main office and works of the company at East Chicago, Ind., and will retain its office in Chicago as a branch sales office. **J. J. Felsecker,** manager of water softening sales, will have charge of the railroad department succeeding W. R. Toppan, resigned.

J. F. Ryan, district manager of the **Texas Company,** with headquarters at New York, has been transferred to Chicago, with headquarters in the McCormick Building, succeeding **W. H. Noble,** who has been transferred to Houston, Texas. **W. E. Greenwood,** assistant manager, with headquarters at New York, will have charge of railroad sales in that territory.

E. R. Mason has been appointed eastern sales representative of the **N. A. Petry Company, Inc.,** Philadelphia, Pa., makers of the Petry bus heating system. Mr. Mason has been connected for a long time with the bus and gas car transportation field, having been associated with the Electric Service Supplies Company as eastern sales manager, and with the Ohio Brass Company as assistant general sales agent. His headquarters are at 1845 Grand Central Terminal, New York City.

Tom G. Windes, manager of the railroad department of the International Filter Company, Chicago, has resigned to become general sales manager of the recently organized **Aluminate Sales Corporation,** Union Stock Yards, Chicago, distributors of aluminate of sodium now being manufactured on a commercial scale for use in water softening. He was born on April 26, 1879, in Chicago and studied chemical engineering at the University of Wisconsin, graduating in 1902. He then entered the employ of the Pfister & Vogel Leather Company, Milwaukee, as a chemist, which position he held until the following year, when he entered the metallurgical laboratories of the Illinois Steel Company, Chicago. Later he was employed as a chemist in the Griffin Car Wheel Works until 1905 when he became associated with the Kennicott Water Softening Company, Chicago. He entered railway service the following year as a chemist in charge of water softening on the Vandalia (now the St. Louis division of the Pennsylvania), where he remained until 1909 when he returned to the reorganized Kennicott Company as manager of the railroad department. In 1916 he became Chicago representative of the L. M. Booth Company, New York, and after the absorption of this company by the Refinite Company, Omaha, Neb., in 1920, continued in the same capacity with the latter organization until July, 1921, when he re-entered the employ of the International Filter Company, Chicago, as manager of the railroad department.

T. G. Windes

T. F. Manville, president and treasurer of **Johns-Manville, Inc.,** New York, was elected chairman of both the board and the executive committee at a recent meeting of the board of directors; **H. E. Manville,** vice-president and secretary, has been elected president; **L. R. Hoff,** general sales manager at New York has been elected vice-president and general manager of the company; **W. R. Seigle** has been re-elected vice-presi-

dent and general manager of the factories and mines; **J. E. Meek**, general manager of the railroad and United States Government department, and **J. W. Perry**, general manager of the electrical department; also **J. S. Carroll**, general manager of the oil industry department have been elected vice-presidents; **A. C. Hoyt**, assistant treasurer has been elected secretary and treasurer and **T. F. Manville, Jr.**, has been appointed assistant secretary, all with headquarters at New York. The members of the newly elected executive committee are T. F. Manville, H. E. Manville, L. R. Hoff and W. R. Seigle.

The Wayne Tank & Pump Company, Ft. Wayne, Ind., has established an organization among the sales representatives of its water softening division, to be known as the Wayne H-2-O Club. Salesmen who have reached their sales quota are eligible for membership. The purpose of the club is to foster better salesmanship in the marketing of the company's products, to create a feeling of friendly rivalry between salesmen and the various district offices and to promote better understanding and co-operation between the field and office forces of the water softening division. Officers of the club will be selected on the basis of the volume of business during the year. The ten members of the board of directors will be those having the next highest volume of business handled. Each representative qualifying for membership in the club will be presented with a gold emblem and a diamond will be mounted on the emblem for each successive year. Special awards will also be given annually for high volumes of business.

H. C. Oviatt, formerly general mechanical superintendent of the New York, New Haven & Hartford is now associated with the **Standard Stoker Company, Inc.**, as assistant to the president, with headquarters in the Grand Central Terminal, New York City. Mr. Oviatt has had many years' railroad experience in both mechanical and transportation departments, having entered the service of the New York, New Haven & Hartford in 1889 as locomotive fireman. He later was promoted to locomotive engineman and subsequently served successively as air brake inspector, master mechanic and assistant mechanical superintendent. He then entered the transportation department as division superintendent and later was promoted to general superintendent. During the war he went with the American International Shipbuilding Corporation at Hog Island and organized and operated the transportation department in connection with the building of ships for the government. He returned to the New York, New Haven & Hartford in 1918 as superintendent of the Central New England and in a few months was made superintendent of motive power of the New Haven; and later general mechanical superintendent. At the time he left railroad work, Mr. Oviatt was a member of the General Committee, the Committee on Locomotive Design and Construction, Section V, Mechanical, of the A. R. A.

H. C. Oviatt

Bucyrus Company

The annual report of the Bucyrus Company for the year ended December 31, 1923, shows earnings aggregating $1,299,932, compared with $746,301 for 1922. The regular dividend on the preferred stock at the rate of 1¾ per cent quarterly was paid throughout the year. During the year 5 per cent in extra dividends was paid on account of the accumulated dividends and in November, 1923, the directors declared an extra dividend of 7 per cent payable January 2, 1924, which dividend appears as a current liability on the balance sheet. After the payment of the January dividend the accumulated dividends aggregated 9 per cent. There remained a balance of $679,932 at the end of 1923, as compared with $326,301 at the close of 1922.

INCOME ACCOUNT

	1923	1922
Net earnings	$1,299,932	$746,301
Dividends	620,000	420,000
Balance	679,932	326,301
Previous surplus	3,585,813	3,259,511
Total surplus	4,265,745	3,585,813
ASSETS		
Cash	$581,621	$435,535
Securities	147,372	143,610
Accounts and Bills Receivable	2,227,468	1,903,534
Inventories	2,765,779	2,568,005
Property account	7,885,874	7,490,973
Total	$13,608,114	$12,541,657
LIABILITIES		
Accounts payable	$488,594	$406,875
Advance payments received	82,953	64,663
Preferred dividend payable	350,000	210,000
Accrued taxes and reserves	420,822	274,306
Preferred stock	4,000,000	4,000,000
Common stock	4,000,000	4,000,000
Surplus	3,585,813	3,585,813
Net earnings	1,299,932	.....
Less dividends	620,000	.....
Total	$13,608,114	$12,541,657

Locomotive Shipments

The following table has been prepared by the Department of Commerce and gives the shipments of locomotives in February and unfilled orders as of February 29, with comparisons for the months of 1922 and 1923, also monthly averages for the years 1920 to 1923:

Year and month	Shipments			Unfilled orders		
	Total	Domestic	Foreign	Total	Domestic	Foreign
1920 monthly average.	199	110	89	1,323	894	429
1921 monthly average.	112	69	43	337	206	131
1922 monthly average.	106	88	18	889	791	99
1923 monthly average.	266	249	17	1,592	1,513	79
1922						
January	74	11	63	207	147	60
February	44	40	4	239	173	66
March	39	35	4	330	255	75
April	21	13	8	617	515	102
May	70	54	16	621	497	124
June	114	67	47	596	495	101
July	128	122	6	811	712	99
August	151	130	21	1,035	926	109
September	119	113	6	1,463	1,347	116
October	145	133	12	1,538	1,420	118
November	159	144	15	1,619	1,501	118
December	210	194	16	1,592	1,498	94
1923						
January	229	217	12	1,788	1,699	89
February	207	196	11	2,220	2,141	79
March	282	269	13	2,316	2,214	102
April	217	201	16	2,204	2,111	93
May	238	228	10	2,150	2,045	105
June	232	221	11	1,958	1,854	104
July	239	211	28	1,738	1,652	86
August	272	259	13	1,497	1,406	91
September	335	313	22	1,178	1,102	76
October	310	295	15	977	915	62
November	299	270	29	691	656	35
December	329	305	24	387	365	22
1924						
January	151	147	4	376	344	32
February	99	92	7	499	466	33

The American Brake Shoe & Foundry Company

The report of The American Brake Shoe & Foundry Company for the year ended December 31, 1923, shows net earnings, after deducting reserve for federal taxes and depreciation, of $2,727,097, equivalent after payment of dividends of seven per cent on the preferred shares to $13.22 per share on the common stock. This amount represents the combined net earnings of: The American Brake Shoe & Foundry Company, American Malleables Company, Dominion Brake Shoe Company, Ltd., Southern Foundry & Machine Company, Southern Wheel Company; and, in addition, the revenue received from: American Manganese Steel Company, American Brake Shoe & Foundry Company of California, American Forge Company, Ramapo Ajax Corporation, in which companies the parent company owns more than a 75 per cent interest. The net profit for the year 1922 amounted to $2,120,540, or $9.60 a share on the common stock.

In his remarks to the stockholders, President Joseph B. Terbell, says:

From its organization, the policy of the company has been to diversify its sources of revenue, believing that in so doing its earnings would be better protected than if they were derived from the manufacture and sale of one product only. All the manufacturing lines in which we are engaged are highly competitive, and only a moderate percentage of profit can be realized; but in the opinion of your management the variety of the products in which we are interested has given greater permanency to the earning power of the company. Your company's sales of brake shoes for the year amounted to less than one-quarter of the combined sales of the companies referred to above.

During the year the brake shoe plants at Portsmouth, Va., and Houston, Texas, were completed and placed in operation.

Your board of directors authorized the erection of an additional brake shoe plant at Kansas City, Mo. It is now in the course of construction, and within a few months we expect it to be in operation.

The Southern Wheel Company was authorized to construct an additional wheel plant at Portsmouth, Va. That plant is also under construction and will shortly be placed in operation.

The American Malleables Company completed the construction of a third furnace at Owosso, Mich., giving it an increased capacity at that point of 33 per cent.

The American Manganese Steel Company acquired a steel castings plant at Denver, Col., in order to better serve the territory tributary to that point; also, through a subsidiary known as the Southern Manganese Steel Company, in which it has a majority interest, it acquired a plant at St. Louis, Mo.

The brake shoe plant at Uniontown, Pa., which has been idle for some years on account of adverse operating conditions, has been sold for an amount slightly under the figure at which it was carried on our books.

It is too early in the year for business to have established a definite trend, but we believe, based on orders so far received and on underlying conditions, that we can expect a satisfactory volume of business during the year 1924.

The consolidated balance sheet of the American Brake Shoe and Foundry Company and subsidiaries, as of December 31, 1923, compares as follows:

Assets	1923	1922
Cash	$1,274,943	$1,141,786
Investments, securities, etc.	1,974,228	1,579,867
Accounts receivable—less reserve	3,051,743	3,819,463
Notes and mortgages receivable	905,373	1,021,314
Inventories	3,402,312	2,672,225
Deferred assets	213,092	128,252
Capital stock of associated companies	3,378,574	3,102,977
Plant and equipment—less depreciation	4,990,285	4,829,261
Patents, goodwill, etc.	6,883,713	6,877,589
	$26,074,263	$25,172,734
Liabilities		
Accounts payable	$1,040,674	$1,333,929
Employees trusted stock	195,730	280,870
Federal taxes (estimated)	478,679	529,922
Reserve for contingencies, etc.	672,662	754,701
Preferred stock	9,538,500	9,538,500
Common stock	7,708,000	7,561,900
Capital stock, subsidiary companies	1,600	1,760
Surplus	6,438,358	5,171,152
	$26,074,263	$25,172,734

American Steel Foundries Company

The net income of the American Steel Foundries for 1923 was $7,595,944 which, after allowing for preferred dividends, left a balance equivalent to $9.55 a share on the common stock as compared with $3,709,866 or $4.23 a share in 1922. A total of $2,166,588 was paid the common stockholders in dividends during the year, compared with $1,836,090 in 1922. The surplus after all charges and allowances was $4,729,636 compared with $860,264 in 1922.

The income account for 1923 and the balance sheet as of December 31, 1923, are as follows:

INCOME ACCOUNT

	1923	1922
Gross sales	$63,591,962	$38,171,148
Expenses	54,560,507	33,689,307
Depreciation	1,370,390	945,625
Operating income	7,661,064	3,536,214
Other income	251,505	552,678
Total income	7,912,570	4,088,892
Interest	17,967	71,420
Bond sinking fund on debentures	.....	340,311
Due minority interest in subsidiary companies	298,658	379,026
Net income	7,595,944	3,709,866
Preferred dividends	607,341	586,691
Preferred sinking fund	92,379	86,511
Common dividends	2,166,588	1,836,090
Year's surplus	4,729,636	860,264
Previous surplus	9,831,296	8,971,033
Surplus	14,560,931	9,831,296
Earned on common	$9.55	$4.23

BALANCE SHEET

Assets	1923	1922
Real estate, plant, equipment, etc., less depreciation	$32,576,363	$32,623,440
Sinking fund	183,383	172,103
Deferred charges	142,995	81,696
Liberty bonds, etc.	4,463,698	2,757,567
Miscellaneous securities	207,020	451,366
Inventories	5,526,544	6,721,238
Accounts and bills receivable	8,071,238	7,841,196
Cash	5,632,297	1,080,176
Total assets	$56,803,538	$51,728,794

Liabilities		
Preferred stock	$9,051,300	$8,381,300
Common stock	24,073,200	24,073,200
Capital stock of subsidiaries not held by American Foundries	4,672,383	4,661,413
Bonded debt	.....	340,800
Reserves	518,522	453,073
Appropriated surplus	160,554	68,785
Profit and loss surplus	14,560,931	9,831,295
Accounts payable	1,429,619	1,833,251
Pay roll accrued	409,300	430,979
Interest accrued	.....	5,680
Federal taxes, etc.	1,386,079	1,189,993
Dividends payable	541,647	459,022
Total liabilities	$56,803,538	$51,728,794

In his remarks to the stockholders, R. P. Lamont, president, said in part:

The operations for 1923 were the most satisfactory in the history of the company. The tonnage of unfilled orders carried over from the preceding year was large, and by the end of the first quarter sufficient additional orders had been booked to practically insure full operations for the entire year. This circumstance, coupled with fairly good labor supply, no strikes and no unusual fuel or transportation difficulties, made it possible to maintain continuous operations at the plants and to turn out 828,701 tons of our products, having a money value of $63,591,962.06—a record both in tons and dollars, not excepting the war years.

You will note a very satisfactory balance sheet, with a ratio of quick assets to liabilities of better than 6 to 1, no borrowed money, working capital of over $20,000,000, and a surplus of about $14,500,000.

There was expended for repairs and maintenance, and charged to operating costs, $3,762,458, and for additions to properties and equipment the sum of $1,137,420. The latter figure includes purchase during the year of the plant and business of The Damascus Brake Beam Company of Cleveland, Ohio.

The carryover into the present year was so small that during January the Steel Foundries' plants operated on about a 40 per cent basis. Fortunately, however, the plants of the company's principal subsidiary were able to operate at fully 75 per cent of their capacity, again demonstrating the value of this business in the evening up of low spots in the operations of the Steel Foundries' plants.

Within the past few weeks there has been a marked improvement in the buying of equipment, and if several large items which are under consideration at the present time materialize into orders, we may, by the beginning of the second quarter, be again running at a good rate and with enough orders on our books to justify the hope of a fairly good year.

Obituary

George Frank Konald, general manager and treasurer of the **Warren Tool and Forge Company**, Warren, Ohio, died in a hospital in that city on March 3, from complications following an operation. He was born at East Douglas, Mass., on June 25, 1864, and at the age of 15 entered the employ of the Iron City Tool Works as a hammerman's helper, later becoming a hammerman. He was employed in various positions in this plant for the following nine years, when, at the age of 24, he succeeded his father as superintendent of this plant. He held this position until December, 1911, when he became associated with the Warren Tool & Forge Company, which had been organized by his brother, M. J. Konald, and J. D. Robertson, and continued his connection with that company until his death.

G. F. Konald

Trade Publications

POSTAL CAR LIGHTING.—The Safety Car Heating & Lighting Company, New Haven, Conn., has issued a 1924 edition of its catalogue on Postal Car Lighting. The catalogue describes conduit, wiring and fixture installations which conform to post-office department specifications and it is distinctive in publications of its kind in that it is, in realty, a text-book on the subject of postal car lighting. It contains 77 pages and is profusely illustrated. It contains post-office department specifications on lighting, descriptions of electric and gas lighting equipment and layouts for 70-ft. and 60-ft. mail cars, and for 30-ft. and 15-ft. mail apartments.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is asking for bids on the remodelling of its Harvey eating house at Syracuse, Kan.

ATCHISON, TOPEKA & SANTA FE.—This company contemplates improvements at its Richmond, Cal., yards, including new trackage and improvements to wharf facilities and shops.

ATCHISON, TOPEKA & SANTA FE.—This company has awarded a contract to Sharp & Fellows Construction Company, Los Angeles, Cal., for the double tracking of 44 miles of its line between Summit, Cal., and Hicks, which will include the handling of 800,000 cu. yd. of earth and heavy rock excavation.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company is asking for bids for the construction of a frame passenger station, 20 ft. by 40 ft., at San Pierre, Ind.

ESQUIMALT & NANAIMO.—This company has appropriated $250,000 for improvements, which include the placing of steel flanking spans on several steel bridges; the renewal of three large steel trestles, and the filling of structures where the Esquimalt & Nanaimo joins the Island Highway at Victoria, B. C.

GREAT NORTHERN.—This company is asking for bids for the construction of a steel coaling station of 500 tons' capacity at St. Paul, Minn.

GULF, COLORADO & SANTA FE.—This company has awarded a contract to the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., for the design of rock-crushing plant and the installation of machinery at Hall Mountain, Texas, near Brownwood, which the company is moving from Coleman. The grading has been contracted to T. A. Griffin, Dallas, Texas, and the concrete work to Martin and Nicholls, Dallas, Texas. The plans of the crusher plant include the installation of one No. 8, one No. 6 and one No. 5 type "K" crushers, operated by steam power.

MISSOURI PACIFIC.—This company is asking for bids for the construction of a pipe line consisting of 4,000 ft. of 8 in. and 275 ft. of 12 in. cast iron pipe at Texarkana, Ark.

NEW YORK, CHICAGO & ST. LOUIS.—This company plans the construction of a concrete coaling station at Cleveland, Ohio.

READING.—This company has awarded a contract to the Curtis-Grinrod Company, Philadelphia, for the construction of a new station with platforms, shelters, drives and walks at Fern Rock, Pa. The company has also awarded a contract to the Smith-Callahan Company, Bala-Cynwyd, Pa., for the construction of a highway at West Manayunk, Pa., which will eliminate a highway bridge over its tracks.

TUCSON, PHOENIX & TIDEWATER.—This company has been granted a 25-year franchise to construct and operate a railroad through Maricopa county, Arizona, by the County Board of Supervisors. The Tidewater Main Line Association has been organized at Phoenix, Ariz., to urge before the Interstate Commerce Commission the railroad's application for a permit to build from Tucson to Phoenix.

UNION PACIFIC.—This company received bids on March 10 for the grading, bridges, culverts and fencing of an extension from Fort Collins, Colo., to a point 17 miles north. The line will have a maximum grade northbound of 1.25 per cent and southbound of 0.65 per cent. The maximum curvature is 3 deg. The company expects to complete the work this summer.

WABASH.—This company plans the construction of additions to its machine shop at Moulton, Iowa, which will double the capacity of the shops.

APPLES shipped from Halifax, N. S., to Great Britain and Ireland this year have totaled 1,011,997 barrels; nearly 25 per cent more than the movement of 1922.

Railway Financial News

ALABAMA NORTHERN.—*Receivership.*—R. L. Schuessler, treasurer and auditor of this railway, with headquarters at Ashland, Ga., has been appointed receiver on the petition of the Southern Iron & Equipment Company, of Atlanta, Ga.

The Alabama Northern operates between Pyriton, Ga., and Ashland, seven miles.

CHICAGO, ROCK ISLAND & PACIFIC.—*Income Account.*—The income account for the year ended December 31, 1923, shows a surplus, after preferred dividends, of $915,367, as compared with a surplus of $718,044 in 1921. A selection of the important figures in the statement follows:

ROCK ISLAND LINES

	1923	1922	Increase or Decrease
Operating Revenues:			
Freight revenue	$93,109,327	$87,718,340	$5,390,987
Passenger revenue	27,458,814	27,650,134	—191,320
Total railway operating revenue	130,403,086	125,086,233	5,316,853
Operating Expenses:			
Maintenance of way and structures	15,669,452	15,701,142	—31,690
Maintenance of equipment	29,153,666	26,103,922	3,049,744
Traffic	2,410,660	2,299,232	111,428
Transportation	54,103,307	52,871,908	1,231,399
General	3,371,291	2,984,821	386,470
Total railway operating expenses	104,990,136	100,570,926	4,419,210
Net revenue from railway operations	25,412,950	24,515,307	897,642
Railway tax accruals	5,600,634	6,163,175	—562,541
Total railway operating income	19,795,314	18,330,344	1,464,970
Total other income	1,795,449	1,765,541	29,909
Total income	21,590,763	20,095,884	1,494,878
Total deduction	17,109,260	15,810,506	1,298,754
Balance of income (available for dividends)	4,481,502	4,285,379	196,124
Dividends:			
7 per cent preferred	2,059,547	2,059,547	.....
6 per cent preferred	1,506,588	1,507,788	—1,200
Total dividends	3,566,135	3,567,335	—1,200
Balance surplus (carried to profit and loss)	915,367	718,044	197,324
Per cent on common stock	1.22	.96	.26

CHICAGO UNION STATION.—*Bond Issue.*—The Interstate Commerce Commission has authorized this company to issue and sell at not less than 94.75 $7,000,000 of first mortgage 5 per cent bonds, and to sell $850,000 of 4½ per cent bonds heretofore issued, to the highest bidder, the proceeds to be used for construction purposes. The proprietary companies were also authorized to guarantee the bonds. The 5 per cent bonds had been sold, subject to the approval of the commission, to Kuhn, Loeb & Co., but the commission, after some discussion of the subject, made its approval of this issue subject to the condition that the other bonds be sold on a competitive basis.

COLORADO, WYOMING & EASTERN.—*Foreclosure Sale.*—The sale of the Colorado, Wyoming & Eastern, which was to have taken place on March 4, has been postponed until April 2 by an order of the United States District Court at Cheyenne, Wyo.

CONEMAUGH & BLACK LICK.—*Stock Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,000,000 of capital stock for the purpose of constructing 16 miles of line in Cambria county, Pa.

DENVER & RIO GRANDE WESTERN.—*Modifications to Readjustment Plan.*—Kuhn, Loeb & Co. and the Equitable Trust Company, reorganization managers, have issued the following modifications to the plan of reorganization:

New general mortgage 5 per cent bonds shall be cumulative income bonds for five years and fixed interest bonds thereafter.

Sinking fund, which was to be used for the purchase of bonds, may be used for capital expenditures.

Utah Fuel dividends shall be paid to new company without qualification for first five years, and thereafter as original plan provided.

Original provision regarding payment of preferred dividends is modified to provide for larger expenditure of earnings for capital needs.

For five years preferred stockholders' committee may examine books at any time.

Amendment provides that maximum of $3,000,000 refunding and improvement bonds may be issued without restriction. Missouri Pacific and Western Pacific are committed to purchase $2,000,000 of these bonds on consummation of plan and an additional $1,000,000 upon request of reorganization managers.

MUSCLE SHOALS, BIRMINGHAM & PENSACOLA.—*No Sale.*—This property had been scheduled for sale under a tax lien on March 3

at Pensacola, Fla., but an agreement was reached before the sale started. The appointment of a receiver was urged.

NORTHERN CENTRAL.—*Income Statement.*—The annual report for the year ended December 31, 1923, shows an income statement as follows:

	1923	Increase or Decrease
Total mileage	142	0.02
Rental received from lease of roads	$2,566,698	—4,411
Interest on funded debt	381,972	—4,892
Interest on mortgages and ground rents payable	14,121	1,630
Organization expenses	4,236	—1,149
Total deductions	400,330	—4,411
Net income	2,166,368	....
Dividends	2,166,172	....
Balance to credit of profit and loss	196	....

NORFOLK & WESTERN.—*Equipment Trusts Awarded.*—This company has awarded $12,000,000 4½ per cent equipment trust certificates, maturing semi-annually to 1934, to the following banking group: Kean, Taylor & Co., Roosevelt & Sons, National Bank of Commerce of New York, and First National Corporation of Boston, at 96.773. This is a basis of approximately 5.22 per cent. The Interstate Commerce Commission authorized the sale of the equipment notes at not less than 95½.

To Consider Lease.—The directors have authorized the appointment of a committee to confer with a similar committee of the Pennsylvania to consider the proposed lease by that company of the Norfolk & Western.

SEABOARD AIR LINE.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of $1,822,437 of equipment trust certificates to be issued by the Chase National Bank, $1,600,000 of the certificates to be sold at not less than 95½ and $202,437.50 of deferred certificates to be sold at par.

ST. LOUIS SOUTHWESTERN.—*Equipment Trusts Offered.*—Harris, Forbes & Co. are offering at prices ranging from 100.49 to 103.10, to yield from 4.50 per cent to 5.20 per cent, according to maturity, $1,800,000 equipment trust 5½ per cent gold certificates.

SULLIVAN COUNTY.—*Bond Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue $357,000 of 6 per cent bonds, to be sold at 97.50 to Paine, Webber & Co., Boston, and the proceeds to be used to retire 4 per cent bonds now outstanding.

TOLEDO, PEORIA & WESTERN.—*Income Account.*—The annual report for the year ended December 31, 1923, shows a corporate income account as follows:

	1923	Increase or Decrease
Operating Revenues:		
Freight	$1,156,770	102,086
Passenger	498,707	—10,967
Total (including other)	1,826,217	109,614
Operating Expenses:		
Maintenance of way and structures	361,975	11,264
Maintenance of equipment	584,451	178,800
Traffic	29,630	—3,143
Transportation	914,469	36,678
General	89,092	—3,393
Total	1,978,592	219,270
Net from railway operations	Def. 152,376	109,656
Railway tax accruals	129,000	—7,000
Railway operating income	Def. 282,475	103,251
Total non-operating income	82,488	5,223
Gross income	Def. 199,987	98,028
Total deductions from gross income	266,444	11,749
Net income	Def. 466,431	86,279

Dividends Declared

Lehigh Valley.—Common, 87½ cents, quarterly; preferred, $1.25, quarterly; both payable April 1 to holders of record March 14.

Northern Pacific.—1¼ per cent, quarterly, payable May 1 to holders of record March 14.

Pere Marquette.—Common, 1 per cent, quarterly, payable April 1 to holders of record March 14. Prior preference, 1¼ per cent, quarterly; preferred, 1¼ per cent, quarterly; both payable May 1 to holders of record April 14.

Pittsburgh, Bessemer & Lake Erie.—Common, 1½ per cent, semi-annually, payable April 1 to holders of record March 15.

St. Louis, Rocky Mountain & Pacific.—1¼ per cent, quarterly, payable March 31 to holders of record March 15.

Trend of Railway Stock and Bond Prices

	March 12	Last Week	Last Year
Average price of 20 representative railway stocks	62.36	62.06	68.83
Average price of 20 representative railway bonds	83.83	83.76	83.19

Railway Officers

Financial, Legal and Accounting

Percy F. Webster, assistant paymaster of the Chicago, Rock Island & Pacific with headquarters at Chicago, has been promoted to paymaster with the same headquarters. **James N. Cook,** assistant cashier, has been promoted to cashier succeeding H. F. Morris, cashier and paymaster, deceased. Mr. Cook will be succeeded by **Leonard G. Ames.**

Operating

R. V. Carleton has been appointed division master mechanic of the Brownville division of the Canadian Pacific with headquarters at Brownville Junction, Me., succeeding **J. S. Allen,** transferred.

James A. Jones, whose promotion to general superintendent of telegraph of the Southern, with headquarters at Washington, D. C., was announced in the *Railway Age* of February 9, page 399, was born on March 27, 1870, at Leaksville, N. C., and was educated in the public schools, and later attended a business college at Danville, Va. He entered railway service in 1887 with the Richmond & Danville, now a part of the Southern, as a telegrapher and station agent, serving in this capacity at various points on this road and its successor, the Southern Railway. In 1895 he was appointed wire chief and manager in the relay office, serving in that capacity until 1909, when he was appointed chief clerk to the superintendent of telegraph. In December, 1916, Mr. Jones was promoted to superintendent of telegraph and telephone, with headquarters at Charlotte, N. C., which position he held at the time of his recent promotion to general superintendent of telegraph.

J. A. Jones

H. R. Fertig, special representative of the general superintendent of transportation of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to chief of yard and terminal operations, with the same headquarters.

A. D. Peters, superintendent of the Sandusky division of the New York, Chicago & St. Louis, with headquarters at Lima, Ohio, has been transferred to the Chicago division with headquarters at Stony Island, (Chicago) Ill., succeeding **H. N. Williams,** who has been granted a leave of absence. Mr. Peters will be succeeded by **H. L. Stonecifer,** superintendent of the Indiana division, with headquarters at Tipton, Ind., who will be replaced by **E. N. Kirby,** trainmaster of the Fort Wayne division, with headquarters at Fort Wayne, Ind. Mr. Kirby will be succeeded by **A. T. Hixon,** general yardmaster, at Fort Wayne, Ind.

Arthur V. Brown, general superintendent of the Northern Pacific lines west of Paradise, Mont., with headquarters at Seattle, Wash., has been appointed acting general manager of the lines west of Paradise with the same headquarters to succeed **Edwin C. Blanchard** who has been granted a leave of absence to serve on the Train Service Board of Adjustment for the Western region. He will be succeeded by **James E. Craver,** general superintendent of lines from Mandan, N. D.,

to Paradise with headquarters at Livingston, Mont. Mr. Craver will be replaced by **Thomas H. Lantry,** superintendent of the Seattle division, with headquarters at Seattle, who in turn will be succeeded by **Frederick R. Bartles,** superintendent of the Rocky Mountain division with headquarters at Missoula, Mont. He in turn will be succeeded by **William C. Sloan,** superintendent of the Yellowstone division, with headquarters at Glendive, Mont., who will be replaced by **Fred C. Huntington,** superintendent of the Fargo division, with headquarters at Dilworth, Minn. Mr. Huntington will be succeeded by **Fred Brastrup.**

Traffic

J. C. Beall has been appointed commercial agent for the Erie, with headquarters at Chicago.

E. Gooch has been appointed assistant to the general passenger traffic manager of the Canadian National Railways with headquarters at Montreal. **H. F. Tilley** has been appointed general agent at Montreal.

W. W. Blakely, whose promotion to assistant to the general freight traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the *Railway Age* of February 23, page 484, was born on October 14, 1866, at Louisville, Ky., and was educated in the public schools of that city. He entered railway service in 1887 as a telegraph operator of the Ohio & Mississippi (now a part of the Baltimore & Ohio) and subsequently served as a contracting agent of the Louisville, Evansville & St. Louis (now a part of the Southern); chief clerk to the traffic manager of the Louisville, St. Louis & Texas (now a part of the Louisville, Henderson & St. Louis); traveling freight agent of the Atchison, Topeka & Santa Fe and traveling freight agent of the Baltimore & Ohio South-western (now a part of the Baltimore & Ohio). Mr. Blakely also served as southern freight agent of the Baltimore & Ohio; commercial agent; division freight agent; chief of the Interchange Commodity Bureau; assistant general freight agent and general freight agent, with headquarters at Pittsburgh, Pa., which position he held at the time of his recent promotion.

W. W. Blakely

E. A. Ferguson, division freight agent of the Springfield division of the Baltimore & Ohio, with headquarters at Springfield, Ill., has been transferred to the Cleveland division, with headquarters at Akron, Ohio.

J. C. Fitzgerald has been appointed general agent for the Chicago, Milwaukee & St. Paul, with headquarters at Denver, Colo., succeeding **A. A. Wilson,** who has resigned to become traffic manager of the Salt Lake & Utah, an electric line.

R. A. Peters, traveling freight agent of the Union Pacific, with headquarters at Kansas City, Mo., has been promoted to general agent, with headquarters at New Orleans, La., succeeding D. M. Rea, deceased. **W. A. True** has been appointed industrial agent, with headquarters at Kansas City, Missouri.

S. G. Reed, assistant to the traffic manager of the Southern Pacific with headquarters at Houston, Tex., has been promoted to assistant traffic manager, succeeding **C. W. Owen,** retired. Mr. Reed will be succeeded by **R. H. Carmichael,** assistant general freight agent with the same headquarters, who in turn will be succeeded by **A. J. Morriss.**

E. C. Meyer, commercial agent for the Chicago & Alton, with headquarters at Milwaukee, Wis., has been promoted to general agent, with headquarters at Peoria, Ill., succeeding M. W. Dancy, whose promotion to assistant general freight and passenger agent, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of February 23.

W. L. Sheehan, general agent, passenger department of the Canadian Pacific, with headquarters at St. Louis, Mo., has been transferred, in the same capacity, to Seattle, Wash., succeeding **E. F. L. Sturdee,** who has been transferred to Hong Kong, China, as acting general passenger agent. **H. R. Mathewson,** assistant general agent, passenger department, with headquarters at Chicago, has been promoted to general agent, rail and steamship traffic, with headquarters at Buffalo, N. Y., succeeding **D. R. Kennedy,** transferred to Montreal, Que., as general agent, steamship traffic. **George P. Carbrey,** assistant general agent, rail department, at New York, has been promoted to general agent, rail and steamship traffic, with headquarters at St. Louis.

Mechanical

H. A. Sigwart, traveling mechanical inspector of the Illinois Central, with headquarters at Memphis, Tenn., has been appointed supervisor of car repairs for the Missouri Pacific, with headquarters at St. Louis, Mo.

Obituary

H. L. Brown, trainmaster of the St. Louis Merchants Bridge Terminal of St. Louis, Mo., died in that city on March 4.

Frederick Crossley, formerly construction engineer of the Canadian Pacific, died at his home in Keighley, Yorkshire, England, on February 26, at the age of 68 years. He entered the service of the Canadian Pacific in 1882 and in 1913, due to failing health, retired, to make his home in England.

James Manson, assistant to the vice-president of the Canadian Pacific, with headquarters at Montreal, Que., died very suddenly at his home in that city on March 7. Mr. Mason was born in Scotland in 1864 and came to Canada in 1883 joining the Canadian Pacific service at Winnipeg, Man., soon after.

Captain John P. Green, formerly first vice-president of the Pennsylvania, died suddenly at Philadelphia, Pa., on March 8, at the age of 85 years, from heart disease. He was born in July, 1839, at Philadelphia and was graduated from high school. He then studied law and was admitted to the bar in 1860. Captain Green served in the Union army during the Civil War. He entered railway service on January 10, 1865, as a private secretary to the first vice-president of the Pennsylvania, serving in that capacity until January 1, 1866, when he was appointed secretary and treasurer of the Milwaukee & Minnesota. On July 1, 1869, he returned to the Pennsylvania as a private secretary to the first vice-president. In 1874 he was promoted to assistant to the president and in October, 1882, he was elected fourth vice-president. On June 30, 1886, Captain Green was elected third vice-president and on March 1, 1892, he was elected second vice-president. Five years later he was elected first vice-president, which position he held until July 31st, 1909, when he retired from active service under the pension rules of the company.

J. P. Green